

BSRE POINT WELLS, LP REDEVELOPMENT PROJECT CRITICAL AREAS REPORT

Snohomish County, Washington

Prepared for:

BSRE POINT WELLS, LP
c/o Karr, Tuttle, Campbell
1201 3rd Avenue, Suite 2900
Seattle, WA 98101

Prepared by:

DAVID EVANS AND ASSOCIATES, INC.
415 - 118th Avenue SE
Bellevue, WA 98005-3553

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Sr. Fish and Wildlife Biologist

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ACRONYMS AND ABBREVIATIONS

BMPs	Best Management Practices
BNSF	Burlington Northern Santa Fe
BO	Biological Opinion
BTEX	Benzene, Toluene, Ethylbenze and Xylenes
CESCL	Certified Erosion and Sediment Control Lead
Corps	U.S. Army Corps of Engineers
CSL	Cleanup Screening Level
dBA	A-weighted Decibels
DEA	David Evans and Associates, Inc.
DO	Dissolved Oxygen
DPS	Distinct Population Segment
DW	Dry Weight
Ecology	Washington State Department of Ecology
EFH	Essential Fish Habitat
ELLW	Extreme Lower Low Water
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FAC	Facultative
FACW	Facultative Wetland
FACU	Facultative Upland
FEMA	Federal Emergency Management Agency
GIS	Geographic Information System
GSF	Gross Square Feet
HPA	Hydraulic Project Approval
HI	Heavy Industrial
L _{eq}	Equivalent Sound Level
LID	Low Impact Development
LWD	Large Woody Debris
mg/L	Milligrams per Liter
MHHW	Mean Higher High Water
MLLW	Mean Lower Low Water
MMPA	Marine Mammal Protection Act
MTCA	Model Toxics Control Act
MUGA	Municipal Urban Growth Area
NFA	No Further Action
NHP	Natural Heritage Program
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NWI	National Wetlands Inventory
NTU	Nephelometric Turbidity Unit
OBL	Obligate Wetland

OHWM	Ordinary High Water Mark
PAHs	Polycyclic Aromatic Hydrocarbons
PBDE	Polybrominated Diphenyl Ethers
PBR	Potential Biological Removal
PCE	Primary Constituent Elements
PEM	Palustrine Emergent
PFO	Palustrine Forested
PHS	Priority Habitats and Species
POW	Palustrine Open Water
PSAMP	Puget Sound Ambient Monitoring Program
PSCAA	Puget Sound Clean Air Agency
PSM	Practical Spreading Model
PSS	Practical Salinity Scale
RM	River Mile
SCC	Snohomish County Code
SCS	Soil Conservation Service
SEL	Sound Exposure Level
SPH	Separate-Phase Hydrocarbon
SQS	Sediment Quality Standard
SRKW	Southern Resident Killer Whale
SWPPP	Stormwater Pollution Prevention Plan
TESC	Temporary Erosion and Sediment Control
TMDL	Total Maximum Daily Load
UGA	Urban Growth Area
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Service
VCP	Voluntary Cleanup Program
VREW	Vapor Recovery and Extraction Well
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington State Department of Natural Resources
WSDOT	Washington State Department of Transportation
WSGA	Washington State Gap Analysis

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1.0 INTRODUCTION

At the request of Blue Square Real Estate (BSRE) Point Wells, LP, David Evans and Associates, Inc. (DEA) conducted this investigation to document the presence of critical areas, existing habitat conditions, level of potential fish and wildlife use in the project vicinity, and project-related impacts that could result from the proposed redevelopment of the project site. This investigation also evaluated priority habitats and species (PHS) as identified by the Washington Department of Fish and Wildlife (WDFW), and federally listed species under jurisdiction of the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) that could potentially occur in the project vicinity. Restoration opportunities were investigated and impact minimization measures for project-related actions are proposed.

1.1 PROJECT SITE HISTORY

The Point Wells facility was reportedly constructed in 1912 after Standard Oil (now Chevron), Shell, and other smaller oil companies purchased the property. The facility was previously used as an asphalt refinery and light products/lube oil distribution terminal. The various types of petroleum products stored or processed at Point Wells included crude oil, asphalt products, lubrication oils, fuel oils, aviation fuels, motor vehicle and marine vessel fuels, and thinners. The light products/lubrication oil distribution terminal is no longer in operation. The asphalt refinery ceased operations in 2000. BSRE Point Wells, LP purchased the site in 2005. Currently, the facility is used for the storage and distribution of marine fuels and asphalt.

The existing facility was reportedly constructed on a salt marsh, which was filled with 4 to 15 feet of imported sand and gravel. The fill has been overlaid with pavement. Groundwater is typically present at depths ranging from 1 to 2.5 feet below the surface in the eastern area and 5 to 8 feet in the western area.

1.2 PROJECT PROPOSAL

The Snohomish County's Comprehensive Plan Map designation of the site has changed from Urban Industrial, to the designation of Mixed Use/Urban Center. The zoning of the site would also be changed from Heavy Industrial to Urban Center with special provisions that require County approval prior to major site redevelopment for mixed use. These plan map and zoning changes were necessary in order to allow the complete, master-planned redevelopment of the industrial portion of Point Wells to be implemented in a manner that successfully facilitates the transformation of this area into a distinct, new mixed-use commercial, recreation, and residential site that is pedestrian-oriented and takes full advantage of its unique and very attractive waterfront setting.

The Point Wells redevelopment project is a multi-phase, master-planned effort to create a totally new mixed-use development on the upland portion of the site. Redevelopment will include a mix of commercial, retail, residential, and public recreational uses (**Appendix A**).

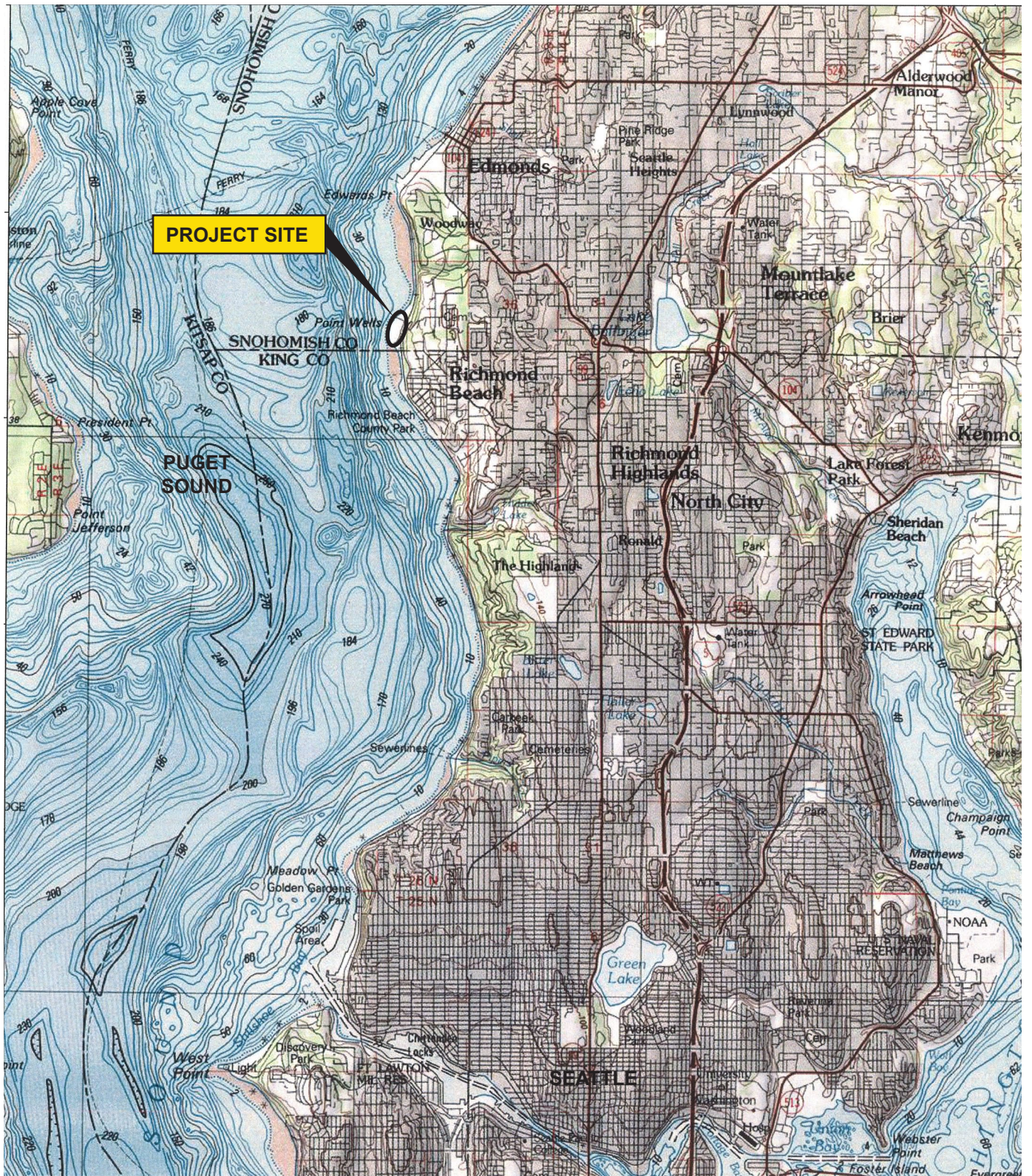
1.3 PROJECT LOCATION

The project site is located north of Seattle, Washington in southwest Snohomish County, along the Puget Sound shoreline, at Point Wells (**Figure 1**). Point Wells is located in Township 27 North, Range 3 East, Section 35. The approximate latitude and longitude of the central project area is 47.78157° N by 122.39490° W. The general location of the project site on United States Geological Survey (USGS) topographic maps is depicted on **Figures 1** and **2**. **Figures 3** and **4** include aerial photographs of the general project area.

The project site encompasses a total of approximately 56 acres to the west of the Burlington Northern Santa Fe (BNSF) tracks and 5 acres to the east of the BNSF tracks. The area to the west of the BNSF tracks consists of five parcels (**Figure 5**). Parcel-specific data from the Snohomish County Assessor webpage is as follows:

1. Parcel Numbers 27033500301200 and 27033500302700. This area is identified as being Heavy Industrial (HI) Urban Industrial, Urban Shoreline Environment, Southwest County Urban Growth Area (UGA), and Woodway Municipal Urban Growth Area (MUGA). This parcel represents the northern half of the project area. Total size is 25.95 acres.
2. Parcel Number 27033500302800. This parcel is identified as being HI Urban Industrial, Urban Shoreline Environment, Southwest County UGA, and Woodway MUGA. This parcel represents the central portion of the project area. Total size is 15.90 acres.
3. The southern portion of the project site includes three parcels, which are currently being used as a construction/staging area for the Brightwater outfall project. These parcels are all identified as being HI Urban Industrial, Urban Shoreline Environment, Southwest County UGA, and Woodway MUGA. Parcel numbers include:
 - 27033500304000. Total size is 2.62 acres.
 - 27033500301100. Total size is 5.75 acres.
 - 27033500303900. Total size is 5.79 acres.

The shoreline immediately west of the project site is identified as Puget Sound Conservancy Shoreline Environment.



Source:
National Geographic, TOPO, 2002



0 1 2
Scale in Miles

Project Vicinity Map

BSRE Point Wells, LP

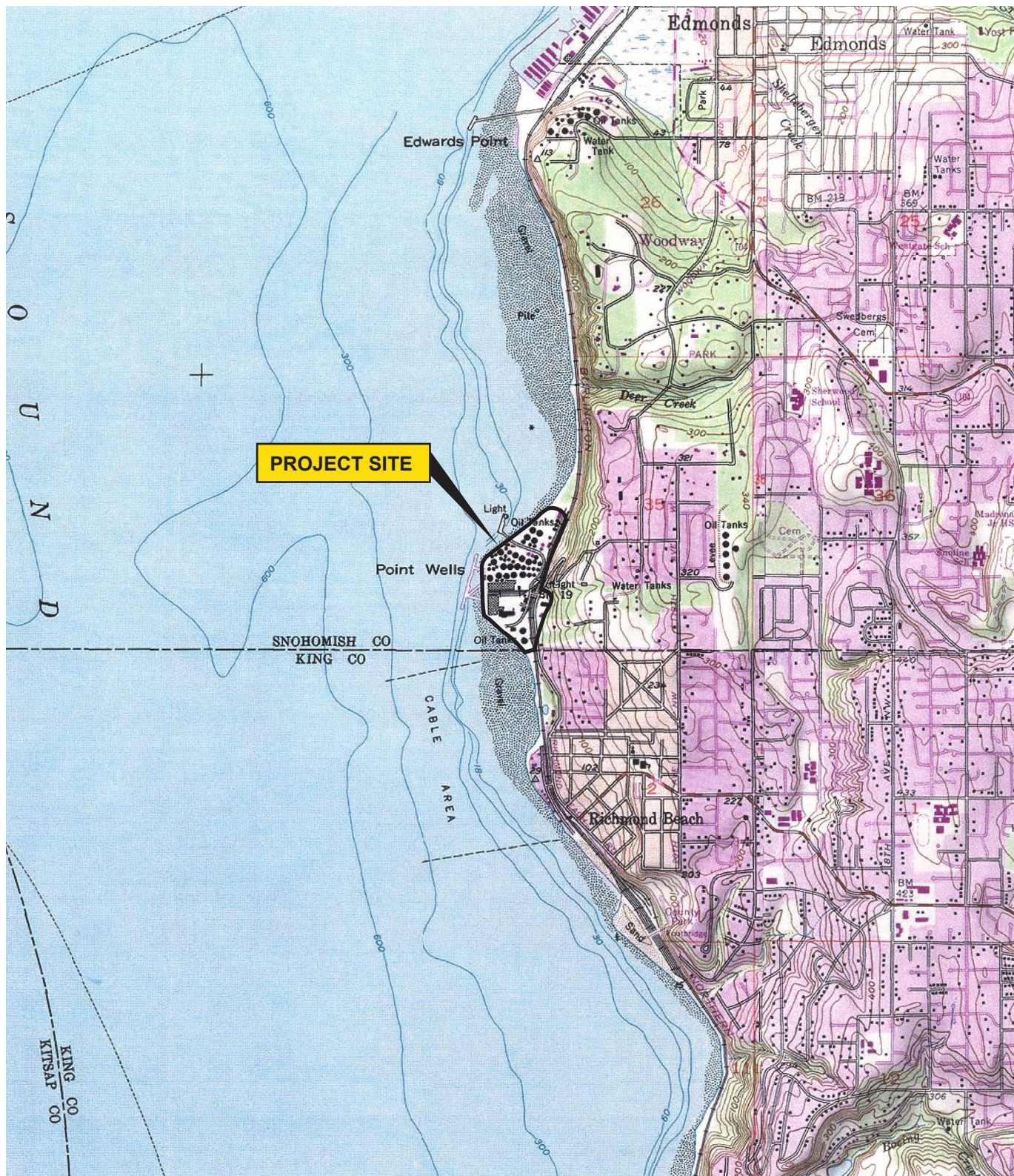
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Figure 1



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Source:
National Geographic, TOPO, 2002



0 .5 1
Scale in Miles

Project Site Map

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Figure 2



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Source:
U.S. Geological Survey 2002 via Microsoft Research Maps.



Aerial Photograph

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Figure 3



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Source:
Washington State Department of Ecology, 1993.

Shoreline Aerial Photograph

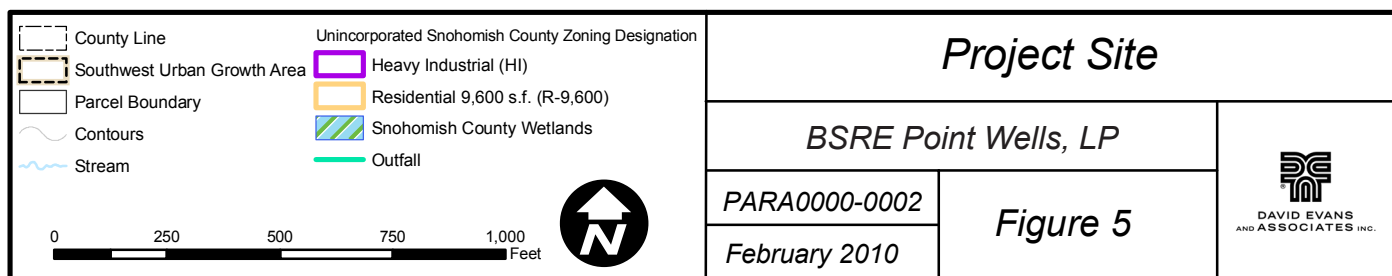
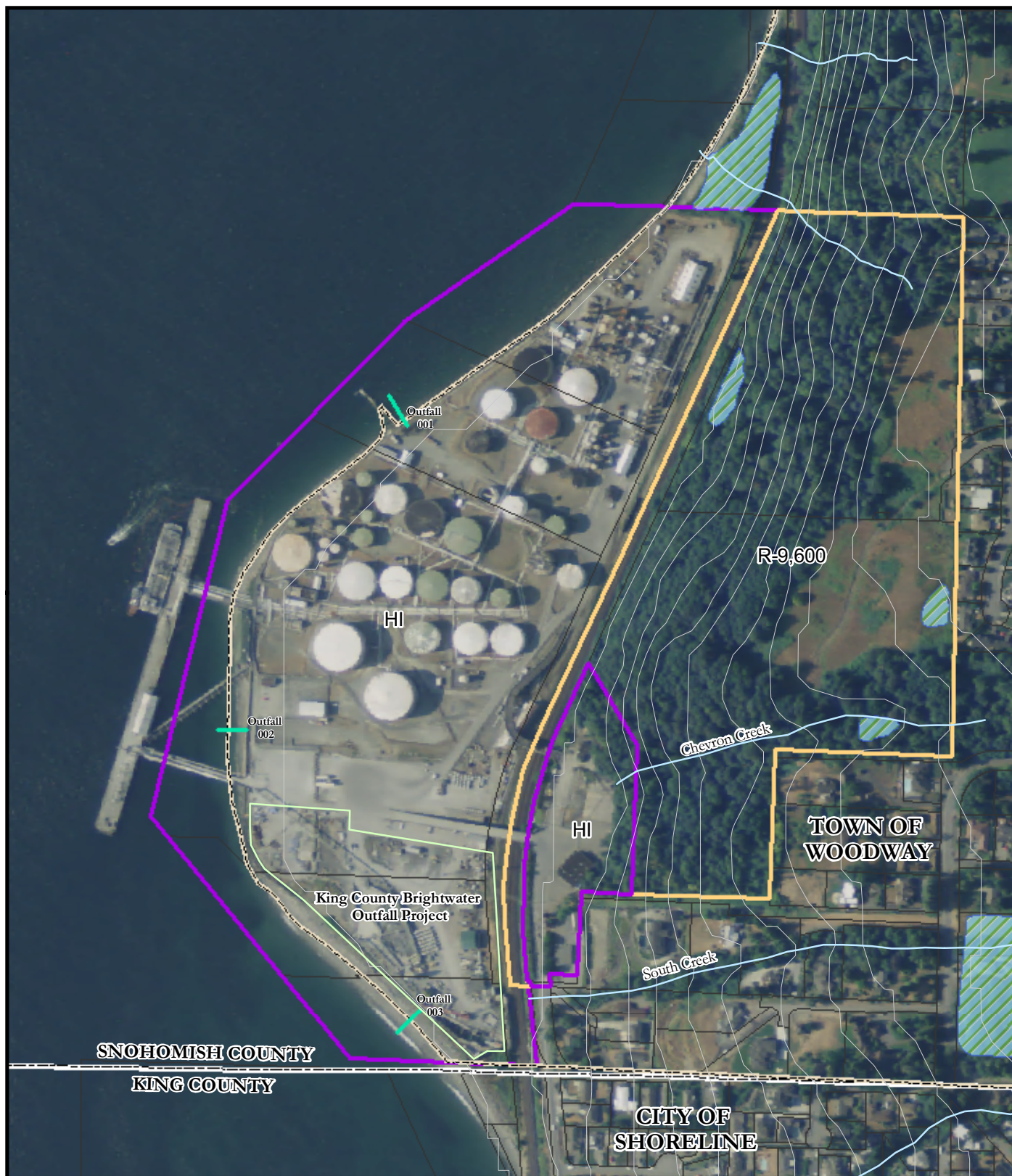
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Figure 4





Source: 2009 NAIP Aerial Photography
Snohomish County GIS
King County GIS

This map was created by David Evans and Associates, Inc. (DEA) for Paramount Petroleum. Accuracy and currency depend upon the source data at the time it is acquired. DEA makes no representation or warranty as to the correctness of the information depicted on this map. It is intended for limited planning purposes as agreed to between DEA and its client and is not suitable for design, survey, construction, or other uses or for other projects. It is strictly forbidden to modify, sell, distribute or reproduce this map for any reason without the written consent of DEA.

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2.0 PROJECT DESCRIPTION

The site includes approximately 61 acres of uplands, tidelands, and submerged lands. Approximately 45 acres of uplands would be rezoned and used for mixed-use redevelopment (**Appendix A**). The adjoining tidelands that would remain undeveloped except for the site's existing deepwater pier and small concrete boat launch ramp. The tidelands would retain their current Shoreline Master Program Conservancy Environment designation. Approximately one acre of the upland area at the southwestern corner of the site would be used indefinitely for the new Brightwater Regional Wastewater Treatment System outfall portal facility (**Figure 5**).

The proposal will include approximately 3,000 residential units. A variety of multi-family, townhouse, and senior housing unit types and sizes will be included. The average residential unit size will be approximately 850 square feet. The proposal will also include approximately 32,000 square feet of commercial space for various office, business, and civic uses. It will also include approximately 94,000 square feet of retail, entertainment, and eating establishment uses.

The proposal will be constructed in four major phases over the course of approximately 15 to 20 years. The environmental cleanup action plan (CAP) and development marketing strategy will each have a strong ongoing influence on the phasing timetable. Building construction and site development will follow cleanup, starting with the primary site infrastructure and public amenities. These improvements will make the development attractive to both potential residents and the community at large. The infrastructure needed to support the proposed site development will be extensive. The development design and construction will be phased in a manner that most efficiently expands the infrastructure necessary to support the needs of the corresponding project phase. Please refer to the Phasing Plan Narrative and diagram contained in the project Urban Center Development Plan Application.

The first phase of the project will begin immediately after project design approval and will include the initial portion of the CAP and related demolition of existing structures. Final project design approval is anticipated to occur in the latter part of 2011.

PHASE 1 – South Village and Initial Urban Plaza Improvements: This phase of the project will include public amenities (first phase of a shoreline public boardwalk), retail uses, a mix of residential unit types, understructure parking, utilities, a police/fire station, interim on-site transit center, stream and shoreline restoration work, and off-site transportation and utility improvements. The South Village area is located at the south end of the site adjacent to Puget Sound. The Urban Plaza is located immediately east of the BNSF Seattle to Everett rail line.

PHASE 2 – Urban Plaza completion: This phase of the project includes the Urban Plaza retail and commercial uses; a mix of residential unit types including senior housing, understructure parking, public amenities, stream restoration, utilities; and a permanent transit hub.

PHASE 3 – Central Village: This is the largest phase of the project and will include residential units of various types. It will also include retail uses, restaurants, understructure parking, utilities, public amenities including a public amphitheater, community building site, clean energy production and waste treatment center, shoreline public boardwalk extension, shoreline restoration and renovation of the existing pier.

PHASE 4 – North Village: This final project phase will include residential units of various types, understructure parking, public amenities including a shoreline public boardwalk extension and large forested open space, and shoreline restoration and utilities.

Urban Plaza – The Urban Plaza will also serve as the project’s commercial center and public transit hub connecting pedestrians with its commuter rail and bus transit station via a new pedestrian bridge to the main portion of the site. It will have a village square character and scale accommodating a mix of uses serving the project’s residents, employees, visitors and surrounding communities with boutique retail, grocery shopping, restaurants, entertainment and other services. The Urban Plaza will also include a mix of offices and senior housing as well as a police and fire station. As a place of arrival it will include landscaped and art filled public gathering spaces.

Urban Villages – Each village will contain a mix of residential unit types, understructure parking, utilities, public amenities, shoreline public access, and site natural feature restoration elements. The South and Central Villages will also include retail and restaurant uses. The Central Village will also create the opportunity to provide a multi-purpose community center facility to serve project residents and surrounding communities, which could include public meeting and exhibition spaces, library, and orientation center for the development. The community center site’s central location within the development will make it directly accessible from the project’s main boulevard and pedestrian bridge, which is linked to the site’s transit hub. The Central Village will also be the location for a clean energy and waste treatment center that will enable a significant amount of the project’s energy to be produced on site.

The project’s three urban villages will each be defined by an iconic urban form in a crescent configuration, creating a sweeping edge of tower structures that capture the panoramic views of Puget Sound and the Olympic Mountains. The North Village will have a distinct character and separate access road off the main boulevard, which meanders through a newly created wooded landscape arriving at the beachfront entrances to the residential buildings.

In all the urban villages, the ground plane steps approximately 14 feet in height from current ground level at the crescent edge and defines a sweeping pedestrian street that intermingles with shop fronts and residential building entrances. The larger scale of the crescent urban form contains and creates a unique place and character of smaller scaled village buildings. This in turn will generate a neighborhood of streets and lanes that offer intimate scaled spaces, view, and pathways connecting to the beachfront and shoreline. All parking for residents is underground, allowing unrestricted pedestrian movement at ground level.

Repurposed Main Pier – The existing 1,050-foot-long main pier will be renovated to become the destination amenity for the development and the surrounding communities. It will be made accessible to the public via a new bridge structure extending from the pier to the beachfront plaza in the South Village. The pier will be functionally and visually upgraded while retaining some of its key marine features and character. Uses such as public viewing and fishing platforms, café, public art, kayak/small sailboat storage along with a boat launch, small seasonal boat moorage, and future passenger ferry terminus will be potentially incorporated.

Public Amenities – The proposal will include a wide range of amenities for public benefit throughout the site. Most of these amenities can be conveniently accessed by the public via the project’s main boulevard beginning at the project entrance, passing through the Urban Plaza with its transit hub and

various retail outlets, crossing over the BNSF rail line on a new bridge, and descending to a large beachfront plaza between the South and Central Villages. This centrally-located public space focal point will include a concentration of amenities including an outdoor amphitheater, shops and restaurant spaces with generous outdoor terraces oriented southwest to capture sun, and views of the waterfront environment. A beachfront pedestrian promenade extending the full length of the site will also be conveniently accessible from this location. It will provide good access to a new nature walk amenity, which will be provided by the creation of a new wetland and daylighting of existing piped water conveyance system between the North and Central Villages. The beachfront promenade will also connect to a new pedestrian bridge, providing access to the previously-described repurposed main pier with its major public amenities.

3.0 IMPACT MINIMIZATION MEASURES

3.1 CONSTRUCTION EROSION CONTROL MEASURES

Erosion control measures will be implemented through the development, implementation, and management of site-specific temporary erosion and sediment control (TESC) plans and stormwater pollution prevention plans (SWPPP). These plans will be subject to review and approval from both Snohomish County and the Washington State Department of Ecology (Ecology) as part of the permit approval process. Proposed measures to reduce or control erosion will include use of multiple Best Management Practices (BMPs). Erosion control measures will use standard BMPs typical to most construction sites, as well as site-specific measures based on existing conditions. Minimum standard measures include:

1. Marking Clearing Limits
2. Establishing Construction Access
3. Controlling Flow Rates
4. Installing Sediment Controls
5. Stabilizing Soils
6. Protecting Slopes
7. Protecting Drain Inlets
8. Stabilizing Channels and Outlets
9. Controlling Pollutants
10. Controlling Removal of Shallow Groundwater
11. Routine Inspection and Maintenance of BMPs
12. Routine Documentation and Reporting
13. Managing the Project

A Certified Erosion and Sediment Control Lead (CESCL) shall be on-site or on-call at all times. Monitoring of on-site BMPs and stormwater outfalls will be required. Monitoring will be carried out to assure water leaving the site meets Washington State standards. Additional actions may be warranted based on the results of the monitoring.

3.2 AIR POLLUTION REDUCTION MEASURES

Proposed measures to reduce or control air emissions or other impacts to air during construction will potentially include measures for reducing both equipment/vehicle exhaust emissions and

fugitive dust. The Washington Associated General Contractors brochure “Guide to Handling Fugitive Dust from Construction Projects” and the Puget Sound Clean Air Agency (PSCAA) suggest a number of methods for controlling dust and reducing the potential exposure of people to emissions from diesel equipment.

The redeveloped site is not likely to produce more air quality impacts than its past and present use for petroleum products storage, processing, and distribution. A commuter trip reduction program for project employees and residents will be implemented and would reduce single occupant vehicle trips. The project’s transit-oriented development design would also encourage site residents, employees, and visitors to use public transit and assist in reducing vehicle trips.

3.3 OPERATIONAL WATER QUALITY CONTROL MEASURES

A fully integrated, state-of-the-art stormwater drainage system will be implemented to provide collection, treatment, and conveyance of stormwater runoff from the developed site based on the latest version of the *Stormwater Management Manual for Western Washington* (Ecology 2005). Implementing an appropriate combination of stormwater management measures and BMPs would mitigate impacts from the redeveloped site. These would include stormwater management facilities that would safely route runoff to receiving waters without creating additional erosion or sedimentation. These facilities would also use oil/water separators to trap potential pollutants. A spill response program tailored to the specific needs of the redeveloped site would also be implemented. The implementation of **enhanced** water quality treatment, use of emerging technologies, and adequate maintenance and monitoring will be required to improve baseline conditions.

3.4 NOISE CONTROL MEASURES

Construction noise could be minimized with properly sized and maintained mufflers, engine intake silencers, engine enclosures, and turning off equipment when not in use. Stationary construction equipment should be located away from sensitive areas where possible. Where this is infeasible, or where noise impacts would still likely occur, portable noise barriers should be placed around the equipment with the opening directed away from the sensitive areas. These measures are especially effective for engines used in pumps, compressors, welding machines, etc., that operate continuously and contribute to high, steady background noise levels. Portable noise barriers provide a reduction of about 10 A-weighted decibels (dBA) in equivalent sound levels, and should be placed between noise generating equipment and the marine environment. Substituting hydraulic or electric models for impact tools such as jack hammers, rock drills, and pavement breakers would also reduce construction noise. Electric pumps could be specified if pumps are required.

3.5 MARINE IMPACT REDUCTION MEASURES

In-water work includes installation of new piles at the primary dock, removal of select old piles at the primary dock, removal of piles and beams at the dilapidated dock and dolphin piling, potential removal of old/unneeded outfalls, construction of new outfalls, installation of three new beach groins, pulling back the existing seawall, and creating an openwater channel through the site by daylighting existing culverts and rerouting flow from several sources. Potential impacts

expected from in-water work include noise generated during installation of piles, disruption of substrate during pile removal and installation, alteration of shoreline processes associated with groins, localized increases in turbidity, and other potential water quality impacts.

One of the primary actions used to reduce potential impacts to fish and wildlife associated with in-water work is to avoid in-water work when sensitive species could be present in the action area. The timing of in-water work is designed to limit impacting specific species, including forage fish, juvenile salmonids, marine birds, and marine mammals. There can be multiple in-water work windows depending on the species present within the action area and agency with jurisdiction. The WDFW typically prohibits in-water work in the marine environment of central Puget Sound from February 16 through July 31 of any year for the protection of migrating juvenile salmonids. The WDFW in-water work window is, therefore, from August 1 through February 15. The USFWS may reduce the in-water work window for pile driving to the time period from October 1 through February 14 to limit impacts to molting marbled murrelets (USFWS 2005). The final in-water work window for the adjacent Brightwater outfall project that also included installing 30 piles at the Point Wells dock was authorized to occur between October 15 and February 15 (U.S. Army Corps of Engineers [Corps] 2005).

Studies to determine how the three proposed groins would influence nearshore processes will be conducted as part of the project specific Environmental Impact Statement (EIS). These studies will be used as the basis of documenting potential changes to the shoreline, project impacts, and if the installation of groins should be included in the final design. Coordination with the regulatory authorities will be required.

In order to reduce impacts associated with in-water work and pile driving within marine waters, a standard set of impact reduction measures is typically applied above and beyond the in-water work window. The following impact measures may be modified after consultation with the USFWS, NMFS, Corps, WDFW, Ecology, and Snohomish County. Project actions are not detailed sufficiently enough at this time to prepare an all-encompassing list of impact minimization measures. The preliminary impact reduction measures include:

- General: In-water pile driving will be limited to October 1 through February 14. Additional timing restrictions may be required by the regulatory authorities.
- NMFS Refined In-water work window: Conduct in-water pile driving during the months of November, December, and January (NMFS 2004).
- New piles will be constructed of steel (no creosote piles or lumber will be used).
- All treated lumber used for the project shall meet or exceed the standards established in *Best Management Practices For the Use of Treated Wood in Aquatic Environments*, developed by the Western Wood Preservers Institute, revised July 1996. All ACZA (e.g., Chemonite treated) lumber shall be treated by the manufacturer per the Post Treatment Procedures outlined in BMP Amendment #1 – Amendment to the Best Management Practices for the Use of Treated Wood in Aquatic Environments: USA Version – Revised July 1996, by the Western Wood Preservers Institute dated April 17, 2002, or current version.

- A vibratory hammer will be the primary means of installing in-water piles. Use of an impact hammer will be limited to load testing.
- During load testing, a 6-inch-thick wood block shall be installed between the piling and the impact hammer.
- During creosote-piling removal and all in-water and over-water work, containment booms and absorbent sausage booms (or other oil absorbent fabric) shall be placed around the perimeter of the work area to capture wood debris, oil, and other materials released into marine waters as a result of construction activities. All accumulated debris shall be collected and disposed upland at an approved site.
- The existing pilings shall be removed and disposed of upland such that they do not enter waters of the state. In the event that the piles cannot be completely removed, the remainder of the pile shall be removed with a clamshell bucket, chain, or similar means; or cut off 2 feet below the mudline.
- Eelgrass and kelp shall not be adversely impacted due to any project activities (e.g., barge shall not ground, anchors and spuds shall not be deployed, equipment shall not operate, and other project activities shall not occur in eelgrass or kelp).
- All debris or deleterious material resulting from construction shall be removed from the beach area and bed and prevented from entering waters of the state.
- Abandoned outfalls shall be removed from waters of the state.
- An emergency spill containment kit must be located on site along with a pollution prevention plan detailing planned fueling, materials storage, and equipment storage. Waste storage areas must be prepared to address prevention and cleanup of accidental spills.
- The SWPPP will identify personnel and procedures and specify materials to be kept on-site for use in responding to emergencies and contingencies.
- All on-site personnel will be trained in spill prevention and spill response procedures.
- No petroleum products or other deleterious materials shall enter surface waters.
- Grading will occur primarily during the dry season between May 1 and September 30.
- Perimeter controls will be installed and temporary pipes and channels will be used to route concentrated stormwater runoff to sediment ponds for treatment.
- Disturbed areas that are not undergoing active construction will be covered with plastic, straw, or temporary grass seed.
- Site remediation measures will be implemented per an approved remediation plan.
- A barge plan will be prepared and implemented to minimize impacts to eelgrass and macro algae present in the immediate location of the existing dock. The barge plan may include use of anchor lines and spuds.

- The new dock ramp and boat slips will be constructed to avoid impacting eelgrass and macro algae located between the existing dock and shoreline.
- Trash receptacles will be strategically placed around the site during both construction and operation of the project site. They will include a cover to eliminate wind from spreading trash and wildlife scavenging. All trash receptacles should be emptied prior to becoming a potential source of pollution.
- Lighting from outside sources will be directed downward and away from the marine environment to the maximum extent practicable. A lighting plan will be prepared that specifically addresses and minimizes impacts to the nearshore marine environment.
- Noise barriers will be installed along the shoreline during construction.

Monitoring and select surveying will be needed to further identify and protect fish, wildlife, and habitats that could be impacted by project-related activities.

- Monitoring will be carried out to assure water leaving the site meets Washington State standards.
- Eelgrass and macro algae surveys will be conducted around and under the dock and dolphin piles.
- Monitor peak and RMS sound pressure levels for each pile; describe size of hammer and impact force, depth of water at each pile, distance between hydrophone and each pile, and depth of hydrophone. Submit a report to the services and Corps within 60 days of completion of pile driving.
- Monitor behavioral changes of marbled murrelets and marine mammals, and document number and species of any observed injured or dead fish or birds during pile driving. Submit a report to the services and Corps within 60 days of completion of pile driving. Include all observations of murrelets and marine mammals in the area of potential biological effect, and distance from dock via GPS.
- Monitor for forage fish spawning starting one week prior to start of in-water pile driving and during pile driving. Pile driving is to stop should forage fish be observed spawning during pile driving. Pile driving may commence one week after forage fish stop spawning. Immediately contact the local area habitat biologist should forage fish be observed spawning during pile driving. Confer with the local area habitat biologist on appropriate measures to protect spawning forage fish.

4.0 METHODS

4.1 PRELIMINARY DATA GATHERING AND REVIEW

Published information about local critical areas was reviewed for evidence of wetlands, streams, and potential fish and wildlife habitat in the project vicinity. This report was prepared following the review of conceptual project plans, public domain resource data, and multiple site visits.

The WDFW PHS program (WDFW 2010) and the Washington State Department of Natural Resources (WDNR) Natural Heritage Program (NHP) were consulted for documented occurrences of priority habitats or species, rare plants, and high quality native ecosystems in the project vicinity. Priority habitats include, but are not limited to, such features as wetlands, riparian areas, snag-rich areas, caves, cliffs, oak woodlands, rocky shorelines, and old-growth forests. Priority species are plants and animals listed by the state or federal government as endangered, threatened, sensitive, candidate, or species of concern. The potential use of the project vicinity by mammals, birds, amphibians, and reptiles was investigated through review of Washington State Gap Analysis (WSGA) data. The information reviewed included:

- Washington State Department of Fish and Wildlife – Priority Habitats and Species (WDFW PHS) data (2010)
- Washington Department of Natural Resources – Natural Heritage Program (WDNR NHP) data (2010): <http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf>
- National Wetlands Inventory (NWI) Online Mapper, U.S. Fish and Wildlife Service (USFWS): <http://wetlandsfws.er.usgs.gov/wtlnds/launch.html>
- Snohomish County - Geographic Information System (GIS) data
- USGS mapping via National Geographic TOPO mapping software
- Snohomish County Stream and Wetlands Survey, Snohomish County Public Works (1987)
- A Catalog of Washington Streams and Salmon Utilization – Volume 1 – Puget Sound Region. Washington Department of Fisheries (Williams et al. 1975)
- Breeding Birds of Washington State – Location Data and Predicted Distributions (Smith et al. 1997)
- Terrestrial Mammals of Washington State - Location Data and Predicted Distributions (Johnson and Cassidy 1997)
- Amphibians and Reptiles of Washington State - Location Data and Predicted Distributions (Dvornich et al. 1997)
- United States Department of Agriculture (USDA) – Soil Conservation Service: Soil Survey of the Snohomish County Area, Washington (1983)
- Snohomish County – Draft Supplemental Environmental Impact Statement: Final Docket XIII Comprehensive Plan Amendment – Paramount of Washington LLC, Snohomish County, February 2009. Available on the www: http://www.co.snohomish.wa.us/documents/Departments/PDS/Planning_Commission/2009/AgendaDocs/DraftSEISParamount.pdf
- King County Brightwater Project Data (multiple reports and data [published and unpublished]).

4.2 ACTION AREA

The action area includes all areas that could be affected directly or indirectly by the proposed project and is not limited to the actual work area (project area). The action area represents the geographic extent of all physical, biological, and chemical impacts from the project (**Figure 6**). The project area and secondary project features are considered when defining the action area. The action area will include potential effects from visual and audible disturbance, terrestrial habitat impacts, and impacts to aquatic environments.

Project-related construction requires pile driving. The project area is within a developed industrial site, but in-water work within the marine environment is proposed. It is assumed that pile driving at the dock will be the dominant underwater noise. Ambient terrestrial noise was determined based on reviewing population density data for the City of Shoreline, which were 4,546 people per square mile during the 2000 census. Based on this data, the ambient noise level (equivalent sound pressure level [L_{eq}]) would be of 55 dBA (Washington State Department of Transportation [WSDOT] 2010). This was then increased to 60 dBA to factor in other variables such as trains and on-going facility day-to-day operations in the immediate project vicinity. Terrestrial noise was determined to attenuate to 60 dBA ambient noise in 0.95 mile.

Underwater noise was determined to attenuate to the assumed Puget Sound Noise level of 135 dBrms in four miles or 6,463 meters. This was determined by estimating 14-inch steel piles driven with an impact driver (195 dBpeak @ 30 meter and 180 dBrms @ 30 meter) using a bubble curtain to obtain a 15 dBpeak reduction per doubling distance (NMFS 2004) and 10 dBrms (WSDOT 2010). This resulted in 180 dBpeak @ 30 meter and 170 dBrms @ 30 meter. The practical spreading model (PSM) was used to determine the distance of attenuation: $R1 = 30 (10^{(170-135)/15}) = 6,463$ meter. Biological effects are species specific. The sound exposure level (SEL) thresholds involve several assumptions documented in the NMFS and USFWS noise calculators. The key assumption is the number of pile strikes per day, which is based on criteria outlined in the WSDOT Advanced Biological Assessment Training Manual (WSDOT 2010). A summary of how noise levels will decrease as distance from the source increases based on the available data is outlined below.

- At 1 meter, noise will be at 206 dBpeak and will cause injury to all fish (NMFS calculator)
- At 1.4 meters, noise will reach 190 dBrms, which represents the injury threshold for sea lions (PSM)
- At 6.5 meters, noise will reach 180 dBrms, which represents the injury threshold for whales (PSM)
- At 30 meters, noise will reach 180 dBpeak and cause injury to diving murrelets (USFWS calculator)
- At 139 meters, noise will reach 160 dBrms, which would disturb but not injure whales and sealions (PSM)
- At 473 meters, noise will reach 187 SEL dB, which would cause injury to fish greater than or equal to 2 grams (NMFS calculator)

- At 646 meters, noise will reach 150 dBrms, which represents the extent of the disturbance threshold for murrelets (USFWS calculator)
- At 874 meters, noise will reach 183 SEL dB, which would cause injury to fish less than 2 grams (NMFS calculator) [Extent of Potential Biological Effects]

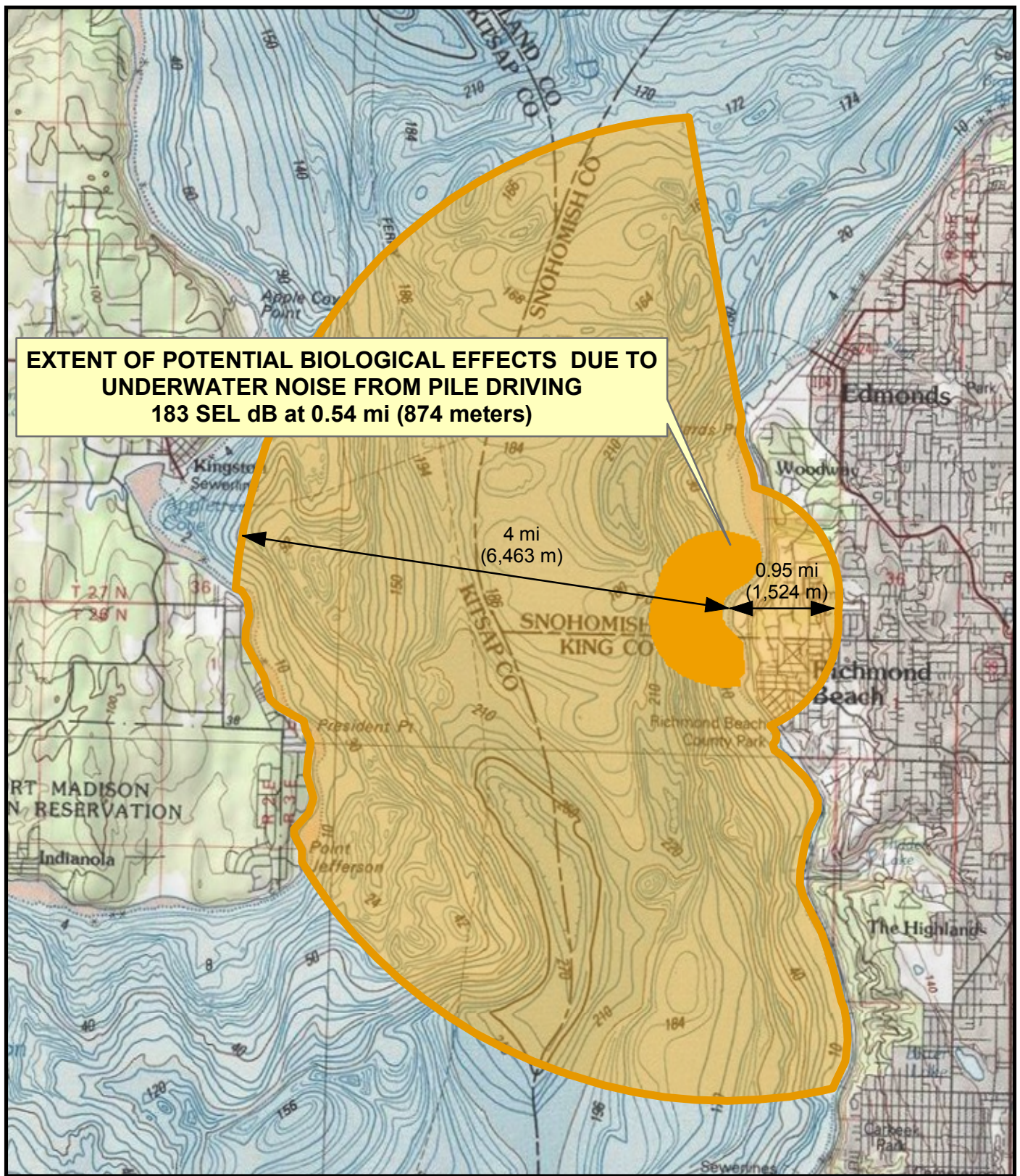
Secondary potential aquatic effects are associated with turbidity and sedimentation during construction and maintenance. The extent of turbidity and sedimentation effects can vary widely depending on area of disturbance, sediment sources, particle size, and tide fluctuations. All work in or near the water, and water discharged from the project area, are required to meet the State's Water Quality Standards, WAC 173-201A. A mixing zone for turbidity is authorized within WAC 173.201A-030 during and immediately after necessary in-water or shoreline construction activities that result in the disturbance of in-place sediments. **Figure 6** provides a visual overview of the action area and extent of potential biological effects due to underwater noise associated with pile driving.

4.3 FIELD INVESTIGATION

DEA performed site visits on October 13 and November 23, 2009, and February 1, 2010, to verify preliminary data findings, delineate wetland boundaries, flag stream ordinary high water marks (OHWM), and document existing habitat conditions and wildlife use. Wetlands were identified on the basis of hydrophytic vegetation, hydric soils, and evidence of wetland hydrology as described in the *Washington State Wetlands Identification and Delineation Manual* (Ecology 1997) and the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and subsequent Corps guidance. Hydrophytic vegetation (i.e., plants adapted to saturated soils) was determined to be present when dominant cover of plants observed (greater than 50 percent) had an indicator status of facultative (FAC), facultative wetland (FACW), or obligate wetland (OBL) (Reed 1988). Plant species in the project area were identified according to Cooke (1997), Pojar and MacKinnon (1994), and Hitchcock and Cronquist (1973), but updated nomenclature was used where known. Hydric soils were determined on the basis of organic matter content, chroma color, and presence of redoximorphic features or other hydric characteristics as stated in the methodology. Evidence of wetland hydrology was determined through the observation of soil saturation, surface ponding, or other indicators such as water-stained leaves, surface scouring, oxidized root channels, sediment deposits, and drainage patterns.

Wetland boundaries and data plot locations were marked with flagging, then surveyed and mapped by professional land surveyors. The Mean Higher High Water (MHHW) level was based on the Corps tidal datum for north Puget Sound of 8.61 feet when using datum plane NAVD88. All wetland and OHWM boundaries, classifications, and assigned buffer widths are subject to review and verification by Snohomish County, Ecology, WDFW, and Corps.

This investigation included an assessment of the presence or absence of wetlands within 200 feet of the project site. DEA staff viewed these offsite areas to the best of their ability, given the visibility and property access conditions at the time of the site visits.



EXTENT OF POTENTIAL BIOLOGICAL EFFECTS DUE TO UNDERWATER NOISE FROM PILE DRIVING
183 SEL dB at 0.54 mi (874 meters)

4 mi
(6,463 m)

0.95 mi
(1,524 m)

Legend

- Action Area
- Extent of Potential Biological Effects

0 0.5 1 1.5 2 Miles



Project Action Area

BSRE Point Wells, LP

PARA0000-0002

March 2010

Figure 6



DAVID EVANS
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Source: Background from National Geographic TOPO!
 Terrestrial and Underwater Noise per WSDOT
 Biological Assessment Advanced Training
 Manual

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5.0 EXISTING CONDITIONS

5.1 WDFW PHS DATA

The PHS map (2010) documents the nearshore marine waters as estuarine wetlands, which abuts the western edge of the project site (**Figure 7**). Two other wetlands are mapped near the project site. The closest is located immediately north of the project site and another approximately 0.25 mile to the east. Dungeness crabs (*Cancer magister*) are mapped as occurring approximately 0.7 mile north of the project site in the vicinity of Edwards Point. Subtidal geoducks (*Panope abrupta*) are mapped approximately 0.2 mile to the north and south of the project site.

Forage fish have been documented spawning along the shoreline at Point Wells (WDFW 2010). Surf smelt (*Hypomesus pretiosus*) and sand lance (*Ammodytes hexapterus*) have been documented spawning along the southwest edge of Point Wells, and sand lance have also been documented spawning immediately north of the project site. However, most of the shoreline along Point Wells is mapped as potential surf smelt/sand lance spawning areas.

Three bald eagle (*Haliaeetus leucocephalus*) nests are mapped as occurring in the vicinity of Point Wells. These nests are all clustered around Deer Creek and likely represent a single territory. Reference numbers are HALE-908-1, 908-2, and 908-3. The closest nest is approximately 0.5 mile northeast of the project site. The shoreline to the west of these nests and north of the project site is mapped as shoreline buffer. The shoreline buffer area extends onto the northernmost portion of the project site (**Figure 7**).

Purple martins (*Progne subis*) have been documented nesting on a piling approximately 0.7 mile north of the project site. Two nests were reported as active in 2004 (WDFW 2010). Great blue herons (*Ardea herodias*) have been documented nesting at the UNOCAL bulk fuel terminal. This area is over 1.25 miles north of the project site. Individual herons have been observed foraging along the shoreline at Point Wells.

No streams are mapped by the WDFW as occurring on the project site. The closest mapped stream with salmonids is Deer Creek, which enters Puget Sound approximately 0.4 mile north of the project site. Salmonid use of Deer Creek is limited to resident cutthroat trout (WDFW 2010).

5.2 WDNR NHP RARE PLANT DATA

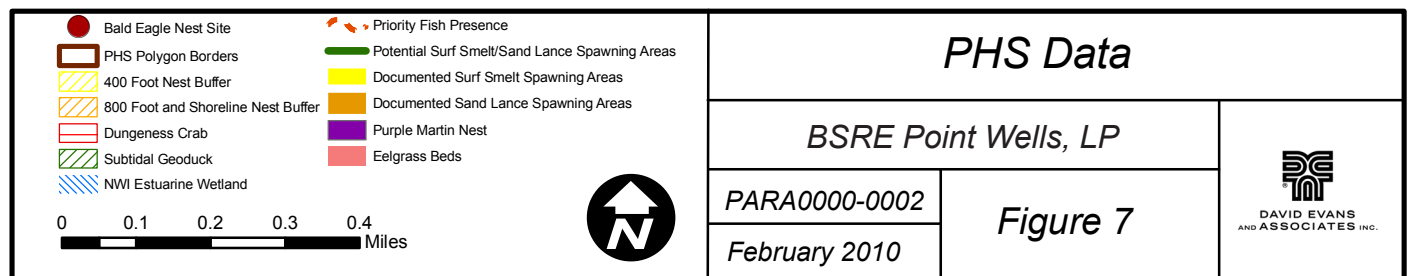
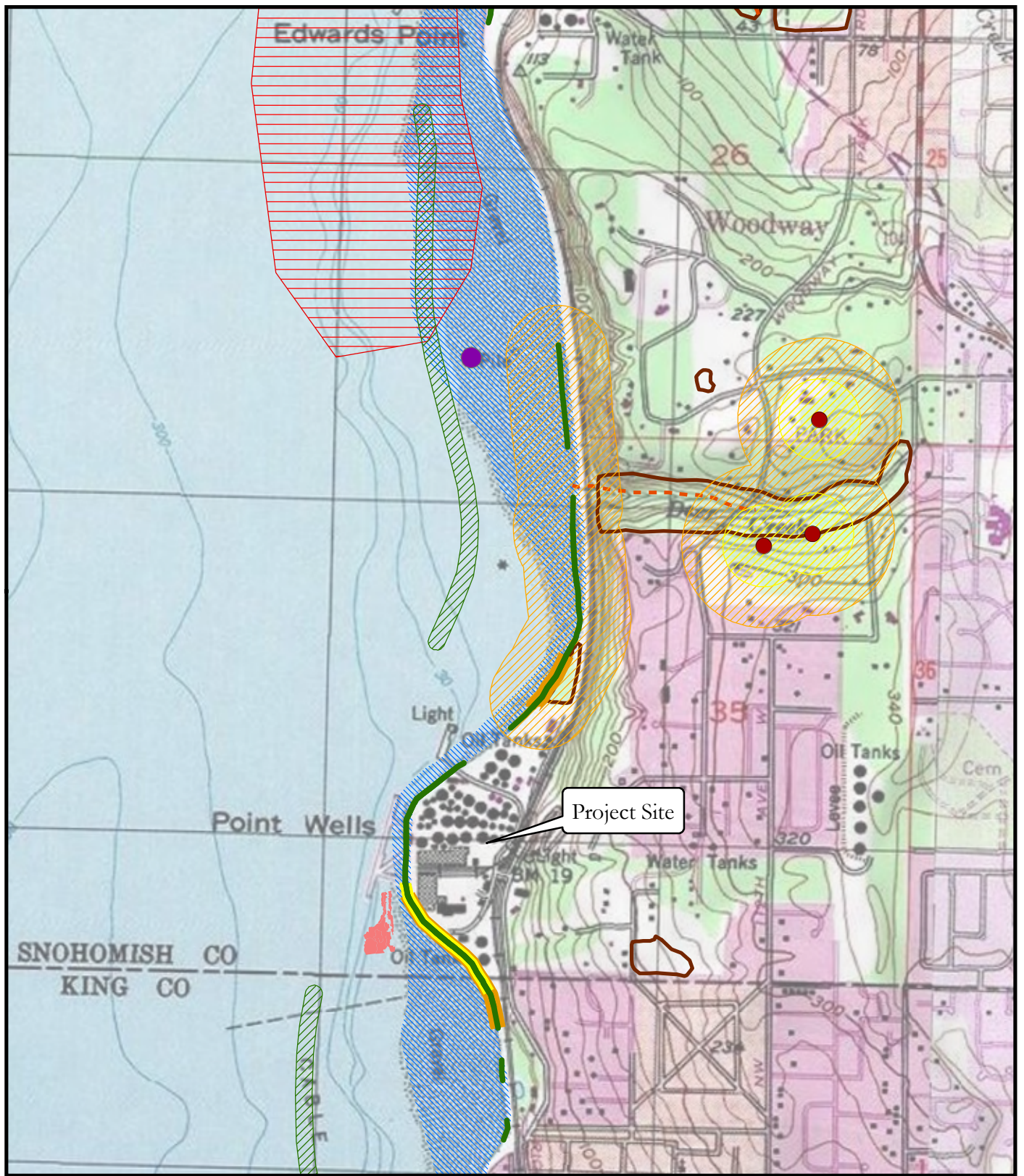
The WDNR reports that 22 rare plants potentially occur in Snohomish County (**Table 1**). Based on a review of the *Sections that Contain Natural Heritage Features Associated with Wetlands* (current as of October 15, 2008), no rare plants or high quality native ecosystems have been documented in T27N R03E S35 (WDNR 2010). The following data are from the WDNR NHP on-line list of known occurrences of rare plants for Snohomish County, updated February 2009.

Table 1: Rare Plants of Snohomish County

Common Name	Scientific Name	State Status ¹	Federal Status ¹	Historic Record
Tall Agoseris	<i>Agoseris elata</i>	S	None	No
Stalked Moonwort	<i>Botrychium pedunculatum</i>	S	SC	Yes
Alaska Harebell	<i>Campanula lasiocarpa</i>	S	None	No
Bristly Sedge	<i>Carex comosa</i>	S	None	No
Poor Sedge	<i>Carex magellanica</i> spp. <i>irrigua</i>	S	None	No
Few-flowered Sedge	<i>Carex pauciflora</i>	S	None	No
Several-flowered Sedge	<i>Carex pluriflora</i>	S	None	No
Smoky Mountain Sedge	<i>Carex proposita</i>	T	None	No
Long-styled Sedge	<i>Carex stylosa</i>	S	None	No
Spleenwort-leaved Goldthread	<i>Coptis asplenifolia</i>	S	None	No
Yellow Mountain-avens	<i>Dryas drummondii</i>	S	None	No
Salish Fleabane	<i>Erigeron salishii</i>	S	None	Yes
Black Lily	<i>Fritillaria camschatcensis</i>	S	None	No
Creeping Snowberry	<i>Gaultheria hispidula</i>	S	None	No
Water Lobelia	<i>Lobelia dortmanna</i>	T	None	Yes
Treelike Clubmoss	<i>Lycopodium dendroideum</i>	S	None	No
Branching Montia	<i>Montia diffusa</i>	S	None	Yes
Choris' Bog-orchid	<i>Platanthera chorisiana</i>	T	None	Yes
Cooley's Buttercup	<i>Ranunculus cooleyae</i>	S	None	No
Pygmy Saxifrage	<i>Saxifraga rivularis</i>	S	None	No
Swertia	<i>Swertia perennis</i>	R1	None	Yes
Flat-leaved Bladderwort	<i>Utricularia intermedia</i>	S	None	No

Note 1. Status Key: E = endangered, T = threatened, S = sensitive, R1 = review group 1 (potential concern but need more field work), R2 = review group 2 (potential concern but unresolved taxonomic questions), LT = listed threatened, SC = species of concern, and Yes under Historic Record indicates the most recent sighting in the county is before 1977.

The 22 rare plants identified as potentially occurring in Snohomish County by the WDNR typically have very specific habitat requirements. These range from being associated with prairie/grassland habitats, bogs and fens, freshwater wetlands or lake margins, high elevation/subalpine habitats, old growth forests, or coniferous forests. No suitable habitat for these rare plants exists at Point Wells.



Source: WDFW PHS Data
King County Dept. of Nat. Res. & Parks

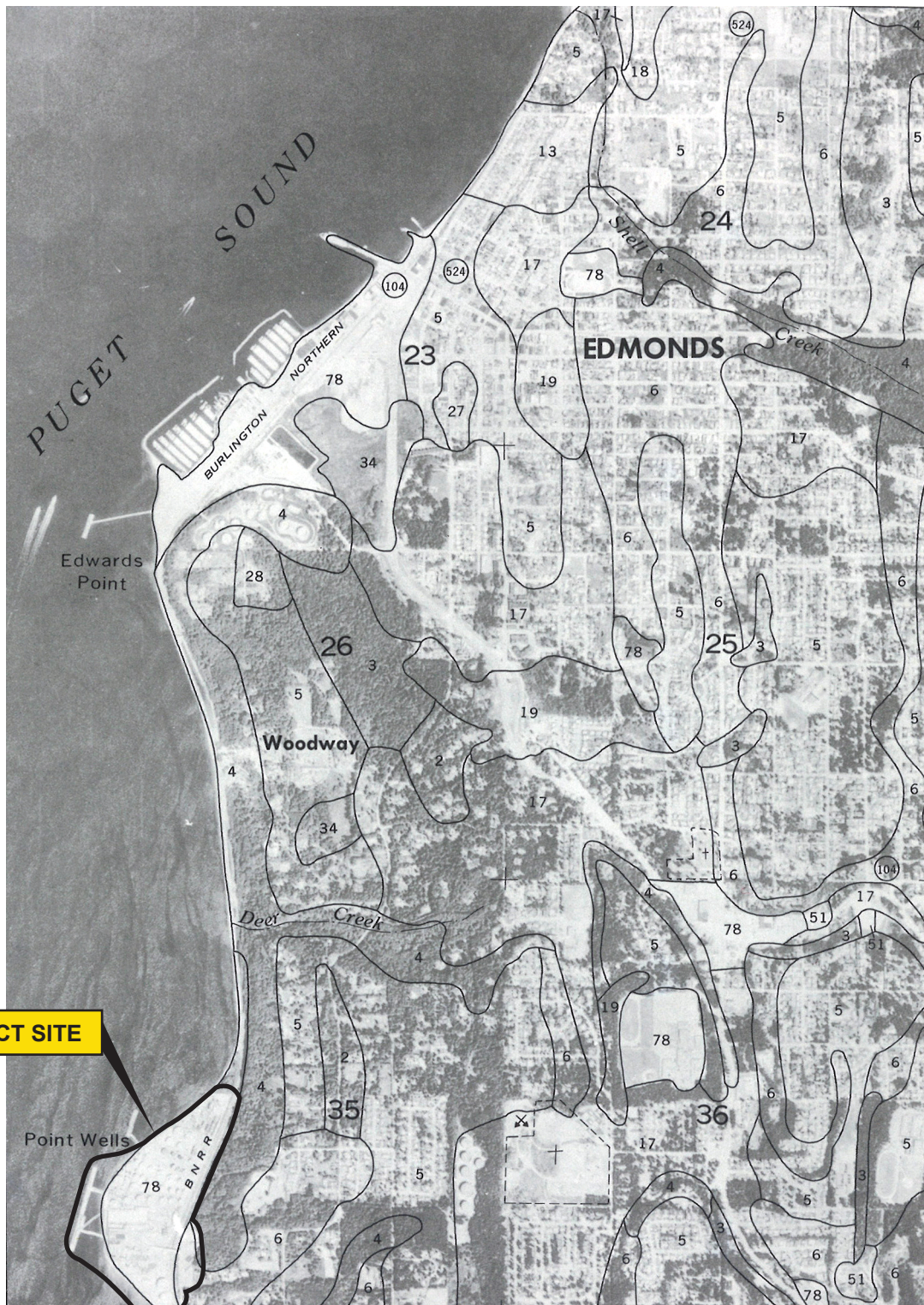
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5.3 U.S. DEPARTMENT OF AGRICULTURE SOIL DATA

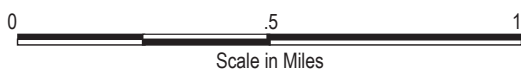
The Soil Survey of Snohomish County mapped soils within the project area (west of the BNSF railway tracks) as Urban land (**Figure 8**). Urban land is defined as nearly level to gently sloping areas covered by streets, buildings, and other structures that obscure or alter the soils such that identification is not feasible (USDA 1983). Two different soil types are identified as occurring on the east side of the BNSF railroad tracks along the bluff. Alderwood-Everett gravelly sandy loam on 25 to 70 percent slopes is mapped along the north east edge of the project site. Alderwood-Urban land complex on 8 to 15 percent slopes is mapped along the southeast edge of the project site. Alderwood soils are moderately deep over hardpan and moderately well drained. Permeability is moderately rapid above the hardpan and very slow within the hardpan. The Everett soil is very deep and somewhat excessively drained with rapid permeability. Runoff is described as rapid with a moderate water erosion hazard. These soils types are not considered hydric.

5.4 STREAMS

The USGS map (**Figure 2**), WDFW PHS map (**Figure 7**), and the Catalog of Washington Streams map (**Figure 9**) do not depict any streams on or immediately adjacent to the project site. However, the Snohomish County Stream and Wetland Survey map (**Figure 10**) indicates four small unnamed streams that drain off the eastern bluff and into Puget Sound. Labels have been added to **Figure 10** for purposes of discussion. Stream #1 does not flow exactly as mapped. It flows off the bluff as mapped but once it reaches the railroad tracks flow is routed to the south along the east side of the tracks and merges with Stream #2. Note that Stream #1 is mapped as flowing into a wetland immediately north of the project site. A wetland does exist to the north of the project site, but it is at least 200 feet north of the fence that defines the northern edge of Paramount Petroleum. Stream #2 is actually a series of small streams/seeps that flow through Category III or IV palustrine forested wetland (PFO) wetlands, all located east of the BNSF railroad tracks along the base of the bluff. Most of this runoff is then captured in a ditch along the east side of the BNSF railroad tracks, which then flows into a culvert under the tracks and onto the north side of the project site. This consolidated flow is then routed through a ditch around the north side of the project site before discharging into Puget Sound. Stream #3 flows through a pipe down the hill slope and under the project site. Stream #4 is primarily off-site and is referred to as South Creek.



Source:
USDA Soil Conservation Service, Soil Survey of Snohomish County Area.



Snohomish County Soil Survey Map

BSRE Point Wells, LP

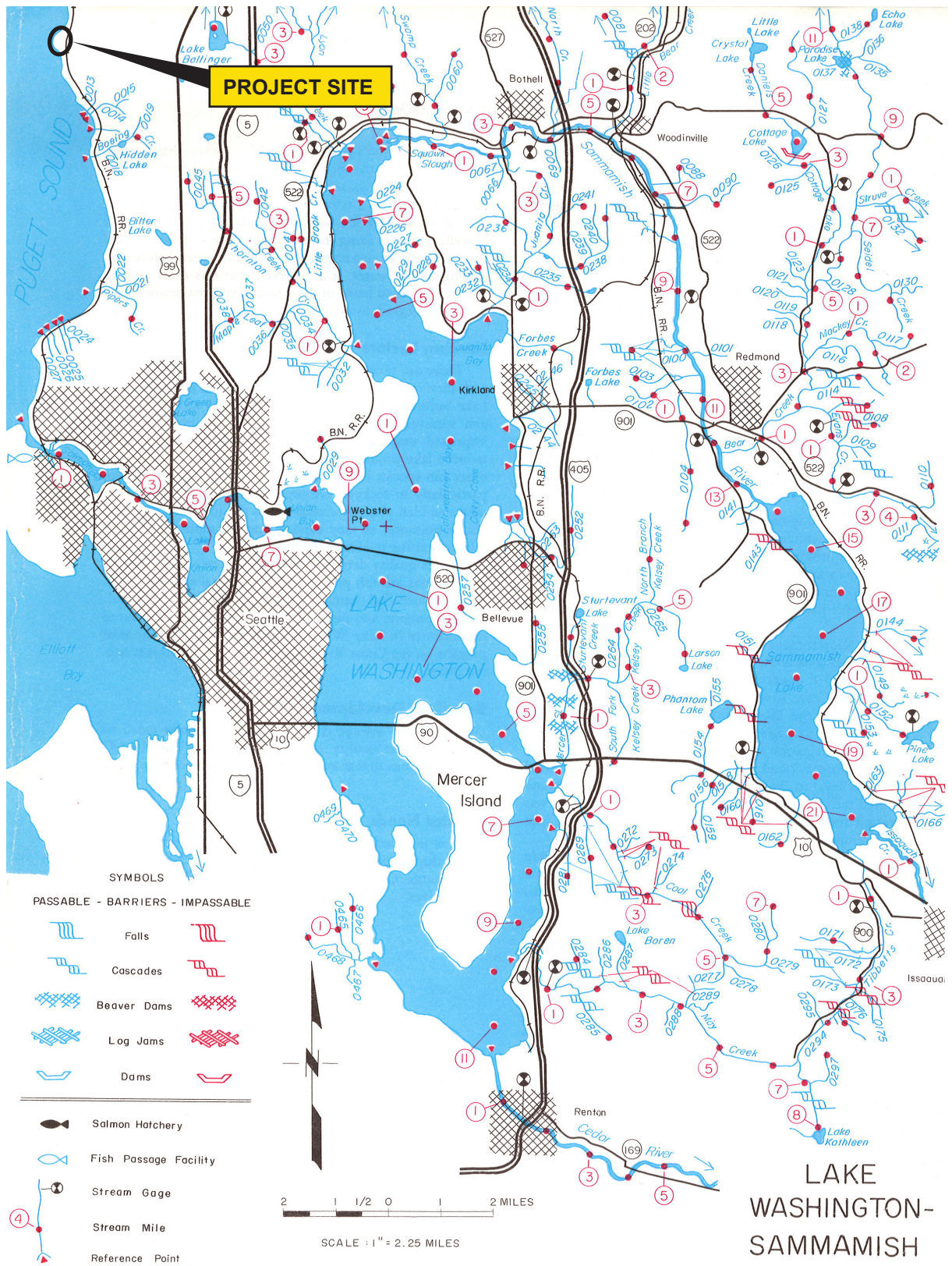
PARA0000-0002

November 2010

Figure 8



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Source: Washington Department of Fisheries, 1975.

WDFW Stream Map

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November 2010

Figure 9



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Source:
Snohomish County Stream and Wetlands Survey, 1987.

Snohomish County Stream and Wetland Survey Map

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November 2010

Figure 10



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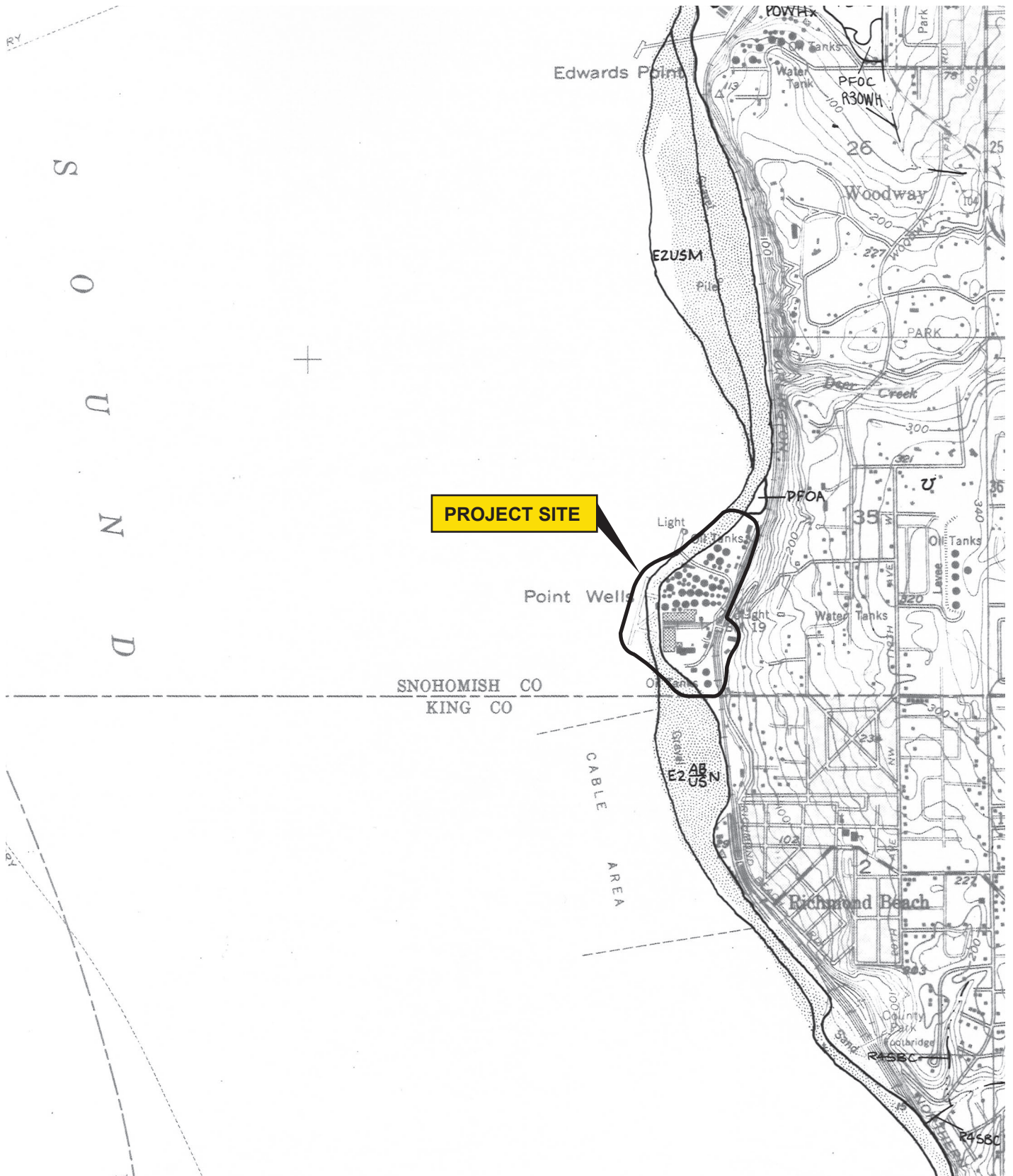
The largest stream is Chevron Creek, which was not included on the older Snohomish County Stream and Wetland Survey map (Snohomish County 1987). Chevron Creek flows into a sediment pond on the east side of the BNSF railroad tracks before being routed through over 1,200 feet of culvert under the project site. South Creek also flows through the project site, and flow from both streams is combined before being discharged into Puget Sound through a metal pipe known as Outfall 003. The OHWM of Chevron Creek was flagged along the lower reach immediately upstream of where it discharges into the sediment pond. Please refer to **Appendix B** for photographs of these features. Photo 9 includes Outfall 003, Photo 25 includes Outfall 002, Photo 32 includes Stream #2 (ditch) discharging to the shoreline, Photo 33 includes the on-site portion of the ditch (Stream #2), Photo 34 includes the ditch on the east side of the railroad tracks, Photo 35 includes the Chevron Creek retention pond, and Photo 36 includes Chevron Creek immediately upslope of the retention pond.

No existing data was discovered that documents the condition of the small tributaries mapped by Snohomish County as occurring in the immediate project vicinity. This is likely due to their small size and absence of salmonids. They are all type N streams, which do not contain fish or fish habitat. Type N streams in Snohomish County require a standard 50-foot-wide buffer. They are generally very small streams that are steep and lack habitat required to sustain either anadromous or resident salmonid populations. The absence of suitable habitat is due to steep gradient, low flow, and lack of pool habitat. The presence of long culverts, outfalls, ditches, and retention pond further negates fish use of these streams.

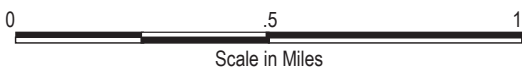
5.5 WETLANDS

Based on a review of the NWI and PHS maps, Snohomish County GIS data, and 1987 Snohomish County Stream and Wetland Inventory map, a PFO wetland that is temporarily flooded is located immediately north of the project site. Site visits verified a wetland is present to the north of the project site, but it is at least 200 feet north of the fence that defines the northern edge of Paramount Petroleum. Due to the extended distance from the project site and that this area is private property not owned by BSRE Point Wells, LP, it was not delineated during the site visits.

The nearshore marine shoreline is identified on the NWI (**Figure 11**) and PHS maps as an estuarine intertidal wetland unconsolidated shore that is regularly flooded or irregularly exposed (E2USM – E2AB/USN). The OHWM was established based on the Corps MHHW elevation datum for central Puget Sound. The OHWM generally coincides with the location of the existing seawall, and due to the placement of fill, the MHHW and OHWM partially overlap, especially along the northern half of the project site. The standard marine waters/estuarine wetland buffer in Snohomish County is 150 feet wide.



Source:
National Wetlands Inventory, U.S. Dept. of the Interior.



National Wetland Inventory Map

BSRE Point Wells, LP

PARA0000-0002

November 2010

Figure 11



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AND ASSOCIATES INC.

The ditch/stream #2 previously described within **Section 4.4** could be classified as a wetland, as it does contain all three wetland parameters. However, it was constructed through upland fill material to convey runoff from the bluff and could, therefore, be considered artificial or man-made. The regulatory authorities (i.e., Corps and Snohomish County) would need to make a jurisdictional determination for this ditch. Vegetation within the ditch included cattails (*Typha latifolia*), reed canarygrass (*Phalaris arundinacea*), water cress (*Nasturtium officinale*), and duck weed (*Lemna minor*). Both sides of the ditch are bermed and dominated by Himalayan blackberry (*Rubus procerus*) and various weeds and grasses. The OHWM of the ditch was flagged, which included all areas with hydric vegetation, gleyed soils, and soils saturated to the surface. This aquatic feature encompasses a total of 5,717 square feet (0.13 acre). See **Appendix A** for the location of this feature.

The wetlands on the east side of the BNSF tracks—as depicted on the Snohomish County GIS and Snohomish County Stream and Wetland Inventory maps along the northeast edge of the project site—were identified as present during the site visits. However, due to their location immediately east of the railroad tracks, they were not flagged. There is a series of three parallel tracks between this wetland area and the project site. Another wetland exists immediately south of the Brightwater facility. This wetland is on the extreme south side of the one-acre parcel that was purchased by King County. The north side of the buffer was significantly impacted by the Brightwater project, which resulted in 0.05 acre of impact with mitigation being undertaken by King County as part of the overall Brightwater project. Regardless of wetland type, no buffers associated with any of these wetlands would extend onto the portion of the site slated for redevelopment.

One wetland not identified on any existing resource map is located immediately south of Chevron Creek. Since project-related activities are planned to occur east of the railroad tracks in this area, it was delineated. This wetland is referred to as Wetland A and is described below.

Wetland A. This wetland is dominated by red alder (*Alnus rubra*), salmonberry (*Rubus spectabilis*), and piggy-back plant (*Tolmiea menziesii*). It is contained within what appears to be an old roadway cut. It encompasses a total of 3,716 square feet (0.085 acre).

Hydrology is dominated by groundwater, with a water table at 4 inches below the surface on November 23, 2009. The soil profile consisted of very dark grayish brown (10YR 3/2) silt loam without mottles from 0 to 10 inches, and gray (5Y5/1) silt loam with strong brown (7.5YR 6/5) mottles from 10 to 16 plus inches. Soils were classified as being depleted below dark surface (A11). Data plot and Ecology rating forms are contained in **Appendix C**.

Conclusion: Although the delineation occurred outside the growing season and the wetland may have been created, all three wetland parameters are present.

Wetland A was rated as a Category IV PFO slope wetland based on the Ecology (2004) rating method (**Table 2**). Based on the survey data, it covers 3,716 square feet (0.08 acre). Wetland A received a total score of 29 points based on functions. Wetland A scored 3 points for water quality functions, 6 points for hydrologic functions, and 20 points for habitat functions. Per Snohomish County Code (SCC) 30.62A.320, the buffer width for a Category IV varies from 25 to 50 feet, based on use of specific mitigation measures and adjoining land use. Since adjoining land use is High Intensity, and that implementation of specified mitigation measures 1 and 2 are

uncertain at this time, the maximum buffer width of 50 feet will be used for purposes of initial planning.

Table 2: Wetland Summary

Wetland ID	Cowardin Vegetation Class	Ecology ¹ Category	Ecology ¹ Wetland Class	Total Wetland Functions Score	Water Quality Functions Score	Hydrology Functions Score	Wildlife Functions Score
A	PFO	IV	Slope	29	3	6	20

¹ Washington State Department of Ecology

Water Quality Functions Score: Wetland A scored low for water quality function due to it being a slope wetland with moderate, but not dense, vegetation cover and no potential pollution-generating source within 150 feet upslope of its location.

Hydrology Function Score: Since vegetation is not dense and no ponding of surface water occurs, Wetland A scored low for hydrology function. The wetland does have the opportunity to reduce flooding and stream erosion since it is upslope of the existing facility, so a multiplier of two was applied.

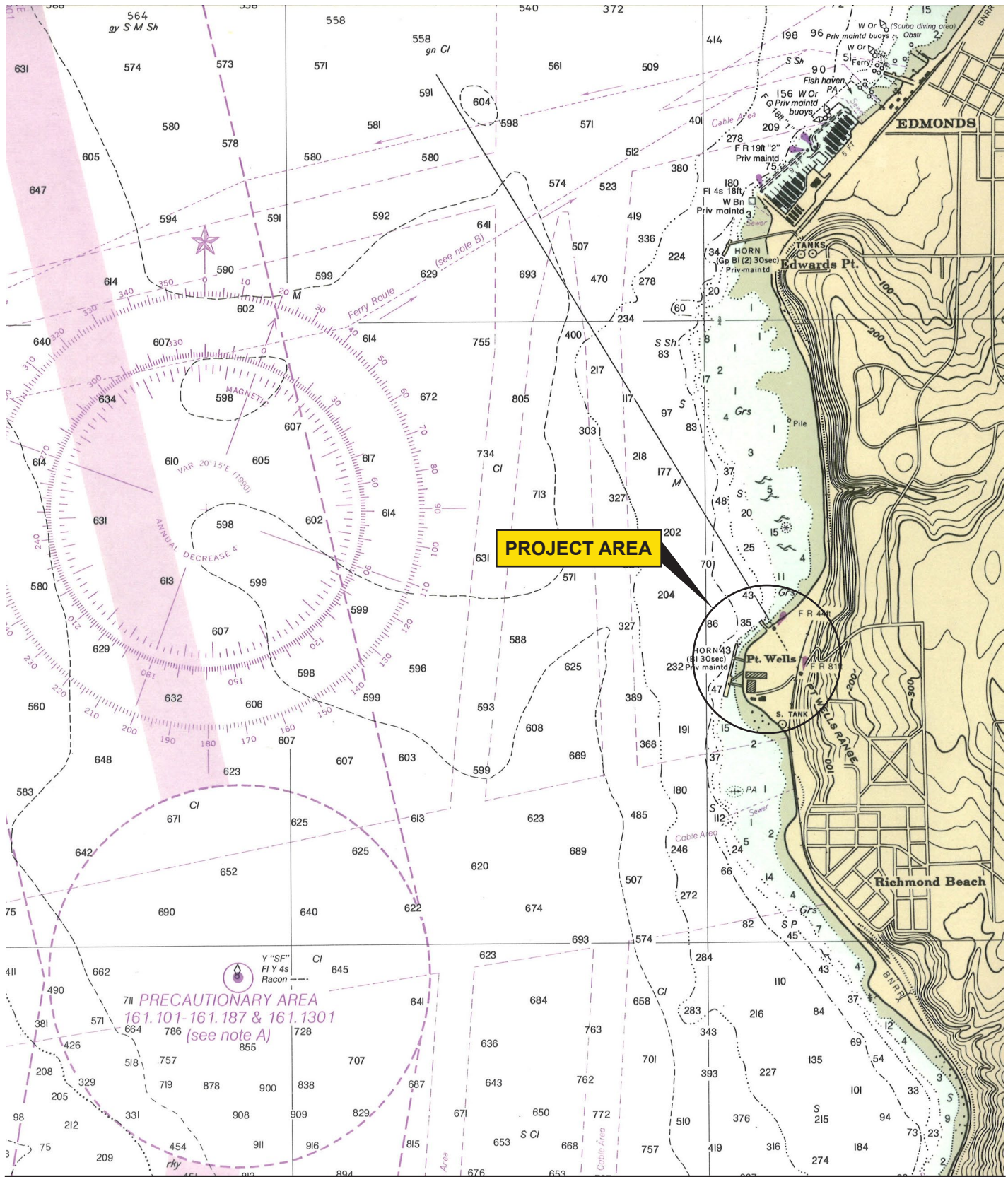
Habitat Function Score: The habitat function score was relatively low due to Wetland A containing only one Cowardin class and minimal plant diversity. However, its buffer is mostly forested for at least 330 feet over 50 percent of its circumference and, factoring its position within the landscape, it received several additional points for being located adjacent to other wildlife habitat.

5.6 MARINE NEARSHORE HABITAT

For purposes of this assessment, marine nearshore habitat includes both built and natural features that occur in or immediately adjacent to the shoreline that influence or affect fish and wildlife. These can be either natural or man-made, and may be either beneficial or detrimental to fish and wildlife. The purpose of this section is to describe the existing condition of marine nearshore habitat at Point Wells. **Figure 12** depicts the project area as outlined on NOAA Chart 18446, with depths in fathoms (1 fathom equals 6 feet) at mean lower low water (MLLW).

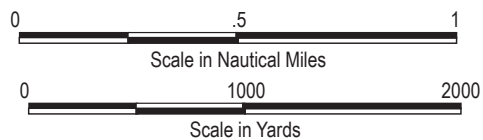
5.6.1 Marine Riparian

The existing marine riparian habitat is degraded and generally void of native vegetation. Upland species present along the shoreline at Point Wells includes several weeds and grasses atop the seawall and along the perimeter of the chain-link fence. Some additional vegetation is present along the south western edge of the shoreline, including American dunegrass (*Elymus mollis*), Japanese knotweed (*Polygonum cuspidatum*), and Himalayan blackberry (*Rubus armeniacus*). Shoreline photos are contained in **Appendix B**.



Source: U.S. Department of Commerce, NOAA
Puget Sound, Apple Cove Point to Keyport.

NOAA Chart 18446



BSRE Point Wells, LP

PARA0000-0002

November 2010

Figure 12



DAVID EVANS
AND ASSOCIATES INC.

5.6.2 In-water Development

Existing in-water development at the project site includes shoreline fill, docks, dolphin piles, and multiple outfalls. The type of material used to construct the edge of fill or seawall varies along the shoreline at Point Wells. The northwest half is composed primarily of large riprap, but changes to steel sheet pile in the vicinity of the dilapidated dock and shoreline building. The shoreline building extends over the shoreline and is supported by wooden piles with a wooden outer edge in the vicinity of the large primary dock. The seawall changes to a concrete wall for a short distance to the south of the large dock, but then changes back to sheet pile and then a combination of wooden planks, wood piles, and large riprap further to the south. The seawall or edge of fill moves away/upland of the shoreline as the site becomes narrower in the vicinity of the on-going construction at the King County Brightwater sewage outfall.

There are two existing docks at Point Wells. The primary large dock is still in use, while the second smaller dock is dilapidated and used primarily by cormorants as a perching platform. The primary dock is approximately 1,050 feet long by 60 feet wide, has two ramps, and is supported by over one thousand piles. Piles are primarily composed of treated wood, but several of them have been replaced or stabilized with steel and/or pile wrap. The remnants of a third dock along the northwest edge of the project site were noted during a site visit. All that remains are pile stubs protruding from the sand. A dolphin piling—a cluster of pilings strapped together near the top—is located immediately north of the primary dock. Photos of these in-water features are included in **Appendix B**.

5.6.3 Large Woody Debris

Large woody debris (LWD) provides various functions along the marine shoreline including fish and wildlife habitat, invertebrate habitat, formation of micro habitat, and beach stabilization. Shoreline development influences how or if LWD can be deposited along the upper shoreline, and is typically inhibited from being deposited where seawalls or fill material have been placed along the shoreline. This impact from shoreline development is apparent at the project site in that LWD is generally restricted to the north and south of the project site.

5.6.4 Macro Algae

Numerous species of seaweed are present within the marine waters off Point Wells. Species distribution is influenced by factors including depth, substrate, and season. King County conducted macro algae surveys during the Brightwater outfall project. Seaweed is typically divided into three primary groups based on color.

Green algae documented by King County (Kimberle Stark 2010 pers. comm.) in the project vicinity included *Acrosiphonia*, green filaments, and ulvoids. Sea lettuce (*Ulva fenestrata*) is one of the most dominant species within the nearshore environment. Red algae documented in the project vicinity included *Ceramium* sp., *Cryptosiphonia woodii*, *Cumagloia andersonii*, *Gelidium* spp., *Gracilaria pacifica*, *Mastocarpus* sp., *Mazzaella splendens*, *Mazzaella heterocarpa/oregona*, *Microcladia borealis*, *Odonthalia floccose*, *Petalonia fascia*, *Porphyra* sp., *Polysiphonia* sp. (unidentified), *Prionitis* sp. (unidentified), *Sarcodiotheca* sp. (unidentified), and *Smithora naiadum*. Brown algae documented in the project vicinity included *Desmarestia* spp., *Punctaria expansa*, and *Scytosiphon simplicissimus*.

Seagrasses are flowering seed plants that have adapted to the marine environment. One of the most ecologically important species in our region is eelgrass (*Zostera marina*). This species can form thick beds in muddy areas from just below tide level to about 20 feet deep. Eelgrass beds have been documented in the marine waters off Point Wells (WDFW 2010). These beds were located along the southwest side of Point Wells. **Figure 7** includes GIS eelgrass data from Battelle's sonar and underwater video surveys conducted in 2008. One eelgrass bed is located immediately south of the primary dock at Point Wells. No eelgrass beds were observed during the site visit, but the tide was not low enough to encounter this species. However, eelgrass (both native and non-native [*Z. japonica*]) were observed washed up along the shoreline.

5.6.5 Substrate Composition

Sand is the dominant substrate along the predominance of the uppermost shoreline. However, gravels are also present, especially near the primary dock and to the north and south of Point Wells. **Appendix B** includes photos of the substrate along the shoreline of Point Wells. It is important to note that substrate grain size will shift or change from year to year and that substrate size influences the type of organisms present, which can also change from year to year. A notable gravel/cobble area is off the southern shoreline, which must be relatively stable due to presence of numerous large butter clams and other marine organisms.

5.6.6 Sediment Quality

Ecology and National Oceanic and Atmospheric Administration (NOAA) have monitored surficial sediment quality in Puget Sound for several years. The purpose of this sampling effort was to determine the quality of sediments in terms of the severity, spatial patterns, and spatial extent of chemical contamination, toxicity, and adverse alterations to benthic infauna. Based on a review of Sediment Quality in Puget Sound Year 2 – Central Puget Sound (Ecology and NOAA 2000), two sampling sites are located in the general vicinity of Point Wells. Stations 121 and 123 are located in the marine waters generally northwest of Point Wells and southwest of Edmonds. Station number 123 is slightly farther west in deeper water. Station 121 lacked any significant chemistry and toxicity parameter. Station number 123 had at least one significant chemistry and toxicity parameter. The compound 4-Methylphenol exceeded sediment quality standard (SQS) and cleanup screening levels (CSL) at Station 123, but not at Station 121. Miscellaneous compounds that exceeded SQS and CSL at Station 121 included 1,2-Dichlorobenzene. Hexachlorbenzene exceeded SQS at Station 121, but not 123.

Mean amphipod survival at Station 121 was 81 percent, while the control was 89 percent. Mean amphipod survival at Station 123 was 78 percent, while the control was 86 percent. The difference between the sample and control was statistically significant at Station number 123. Amphipod survival and urchin fertilization testing indicated samples were “generally” not toxic.

5.6.7 Water Quality

The Ecology – 2008 Water Quality Assessment for Washington includes data for Puget Sound. Data specific to the general project area near Point Wells includes four listings based on the requirements of Sections 303(d) and 305(b) of the Clean Water Act. **Table 3** summarizes water quality data specific to Puget Sound waters off Point Wells.

Table 3: Puget Sound 2008 Water Quality Assessment

Parameter	Category	Medium	Area
Dissolved Oxygen	1	Water	Puget Sound North-Central
Dissolved Oxygen	2	Water	Puget Sound Central
Sediment Bioassay	2	Sediment	Puget Sound North-Central
Fecal Coliform	5	Water	Puget Sound Central

The listed categories are defined as follows:

- Category 1 – Meets tested standards for clean waters.
- Category 2 – Waters of concern: Waters where there is some evidence of a water quality problem, but not enough to require production of a water quality improvement project total maximum daily load (TMDL) at this time.
- Category 3 – Insufficient data: This category will be largely empty. Water bodies that have not been tested will not be individually listed, but if they do not appear in one of the other categories, they are assumed to belong here.
- Category 4 – Polluted waters that do not require a TMDL: Waters that have pollution problems that are being solved in one of three ways:
- Category 4a – has a TMDL: Water bodies that have an approved TMDL in place and are actively being implemented.
- Category 4b – has a pollution control program: Water bodies that have a program in place that is expected to solve the pollution problems. While pollution control programs are not TMDLs, they must have many of the same features and there must be some legal or financial guarantee that they will be implemented.
- Category 4c – is impaired by a non-pollutant: Water bodies impaired by causes that cannot be addressed through a TMDL. These impairments include low water flow, stream channelization, and dams.
- Category 5 – Polluted waters that require a TMDL: The traditional list of impaired water bodies known as the 303(d) list. Placement in this category means that Ecology has data showing that the water quality standards have been violated for one or more pollutants, and there is no TMDL or pollution control plan. TMDLs are required for the water bodies in this category.

King County has sampled the marine environment near the project site (King County 2009). The following data is from *Water Quality Status Report For Marine Waters, 2005-2007* (King County 2009). The two closest sampling stations are JSUR01 (offshore from Point Wells) and JSVW04 (beach at Point Wells). Data from JSUR01 is limited to bacteria and general water quality parameters, while data from JSVW04 includes organics, metals, and conventional parameters from sediment, water, shellfish, and algae.

Station number JSUR01 meets primary contact recreation marine surface water standards during all months/years sampled. Station number JSVW04 was in compliance with fecal coliform standards during all months. Generally speaking, offshore sites typically meet fecal bacteria standards, while beach sites tend to be more variable.

Basic water quality data from JSVW04 (beach at Point Wells) collected during 2007 was as follows. Ammonia ranged from <0.010 to 0.0696 milligrams per liter (mg/L); the highest measurement occurred on July 18, 2007. Nitrate/Nitrite NO₂ + NO₃ ranged from 0.181 to 0.444 mg/L; the highest measurement occurred on January 17, 2007. Total Phosphorous (Total P) ranged from 0.0673 to 0.0968 mg/L; the highest measurement occurred on February 20, 2007. Salinity ranged from a low of 27.019 to a high of 29.906 practical salinity scale (PSS). Salinity is typically lower during the winter/spring rainy season and higher during the drier summer season. Water temperature was seasonally variable, ranging from a low of 7.0°C (44.6°F) on January 17, 2007 to a high of 13.4°C (56.1 °F) on July 18, 2007.

Other parameters such as transparency, dissolved oxygen, turbidity/transmissivity, chlorophyll-a, photosynthetically active radiation, and salinity were measured as part of the conventional water quality monitoring program. Except for the maximum turbidity value being measured at Station JSUR01 at a depth of 173 meters during March, no other anomalies or significant deviations from the norm were reported for offshore or beach monitoring stations near Point Wells.

The marine waters monitoring program conducted by King County (2009) included sampling intertidal sediments for the presence of 14 different metals. Four of the metals (arsenic, cadmium, selenium, and silver) were not detected at any sample sites. Mercury was detected at Golden Gardens and Alki Beach, but not Point Wells. Oil and grease was detected at all 8 beach sites (including Richmond Beach [JSVW04]) with concentrations from all sites ranging from 180 to 250 milligrams per kilogram, normalized to dry weight (mg/Kg DW). Organic carbon was not detected in samples collected at Richmond Beach. Pyridine was detected at Richmond Beach at a concentration of 38 micrograms/Kilogram DW (µg/Kg DW), which is just above the level of detection. Potential sources of pyridine include antifreeze and fungicides. No polycyclic aromatic hydrocarbons (PAHs) were detected at Richmond Beach. The highest PAH readings were noted at the Salt Water State Park station.

Sampling for polybrominated diphenyl ethers (PBDEs) at Point Wells detected concentrations ranging from 1.59 to 2.59 µg/Kg DW, which was similar to concentrations detected at West Point. Other compounds detected at Point Wells include benzyl alcohol at 93 µg/Kg, and chlorinated pesticide at 1.65 µg/Kg.

The presence of metals in shellfish tissue was also analyzed by King County (2009). The mean level of total Chromium in shellfish tissue from Point Wells was 2.01 mg/Kg DW, which was about average when looking at the five sites sampled. The mean level of total Copper in shellfish from Point Wells was 16.0 mg/Kg DW, which was the highest level recorded. The next highest Copper level recorded was from Alki Point, which was 11.7 mg/Kg DW. The mean level of total Nickel in shellfish tissue from Point Wells was 5.29 mg/Kg DW, which was about average when looking at the five sites sampled. The mean level of total Zinc in shellfish tissue from Point Wells was 85.2 mg/Kg DW, which was the highest recorded. The next highest Zinc level was recorded from Normandy Park, which was 83.3 mg/Kg DW.

5.7 INVERTEBRATES

Invertebrates include a wide array of different species, which were included in the marine surveys conducted for the Brightwater outfall project (Kimberle Stark 2010 pers. comm.). The following table includes, when known, the scientific name, common group, and common name of marine invertebrates observed during the Brightwater surveys conducted in 2006. Many invertebrates in **Table 4** do not have common names, and some species have several.

Table 4: Invertebrates

Scientific Name	Common Group / Name
<i>Allorchestes angusta</i>	Amphipod
<i>Ampithoe dalli</i>	Amphipod
<i>Ampithoe lacertosa</i>	Amphipod
<i>Anisogammarus pugettensis</i>	Amphipod
<i>Anthopleura</i> spp.	Anemone
<i>Armandia brevis</i>	Polychaete worm
<i>Boccardiella hamata</i>	Polychaete worm
Bryozoa (miscellaneous)	Bryozoan
<i>Capitella capitata</i>	Polychaete worm
<i>Cauleriella pacifica</i>	Polychaete worm
<i>Clinocardium nuttallii</i>	Bivalve / Heart Cockle
<i>Crepidula dorsata</i>	Gastropod
<i>Crangon franciscorum</i> ssp. <i>franciscorum</i>	Shrimp / Sand Shrimp
<i>Crassostrea gigas</i>	Bivalve / Pacific oyster
<i>Diopatra ornata</i>	Polychaete worm
<i>Edwardsia sipunculoides</i>	Anemone / Sipunculid Anemone
<i>Epiactis prolifera</i>	Anemone / Brooding, proliferating, or small green anemone
<i>Eteone californica</i>	Polychaete worm
<i>Eteone longa</i>	Polychaete worm
<i>Eteone pacifica</i>	Polychaete worm
<i>Euclymene</i> spp.	Polychaete worm
<i>Eulalia sanguinea</i>	Polychaete worm
<i>Evasterias troschelii</i>	Seastar / Mottled Seastar
<i>Exosphaeroma inornata</i>	Isopod
<i>Fabia subquadrata</i>	Crab / Grooved mussel, mussel, or pea crab
Family Hippolytidae	Shrimp
Flatworm (unidentified)	Flatworm
Gammarid amphipods	Amphipod
<i>Glycera americana</i>	Polychaete worm
<i>Glycinde picta</i>	Polychaete worm
<i>Gnorimosphaeroma oregonense</i>	Isopod / Oregon pillbug
<i>Harmothoe imbricata</i>	Polychaete worm / Fifteen-scaled worm
<i>Haminoea vesicula</i>	Gastropod / Sea Slug
<i>Hemipodus borealis</i>	Polychaete worm
<i>Hemissenda crassicornis</i>	Gastropod / Opalescent Nudibranch
<i>Hemigrapsus nudus</i>	Crab / Purple shore crab

Scientific Name	Common Group / Name
<i>Hemigrapsus oregonensis</i>	Crab / Green shore crab
<i>Hesionid</i> sp. (unidentified)	Polychaete worm
<i>Hyale frequens</i>	Amphipod
<i>Idotea</i> sp.	Isopod
<i>Lacuna</i> spp.	Gastropod
<i>Leptosynapta clarki</i>	Sea cucumber / Burrowing sea cucumber
<i>Leitoscoloplos pugettensis</i>	Polychaete worm
<i>Littorina scutulata</i>	Gastropod / Checkered periwinkle
<i>Lophopanopeus bellus bellus</i>	Crab / Black-clawed crab
<i>Lottid limpets</i>	Gastropod
<i>Lucina tenuisculpta</i>	Bivalve
<i>Lumbrineris zonata</i>	Polychaete worm
<i>Magelona hobsonae</i>	Polychaete worm
<i>Macoma inquinata</i>	Bivalve / Pointed macoma
Majid (spider) crab	Crab
<i>Macoma nasuta</i>	Bivalve / Bent-nose macoma
<i>Malmgreniella nigralba</i>	Polychaete worm
<i>Margarites</i> sp.	Gastropod
<i>Mediomastus californiensis</i>	Polychaete worm
<i>Megalorchestia pugettensis</i>	Amphipod
<i>Metridium</i> sp.	Anemone
<i>Micropodarke dubia</i>	Polychaete worm
<i>Mopalia lignosa</i>	Chiton / Woody chiton
<i>Mopalia muscosa</i>	Chiton / Mossy chiton
<i>Mytilus trossulus</i>	Bivalve / Foolish mussel
<i>Mysella tumida</i>	Bivalve / Robust mysella
<i>Naineris dendritica</i>	Polychaete worm
<i>Nassarius</i> sp.	Gastropod
<i>Nephtys caeca</i>	Polychaete worm
<i>Neotrypaea californiensis</i>	Shrimp / Ghost shrimp
<i>Nephtys caecoides</i>	Polychaete worm
<i>Nephtys ferruginea</i>	Polychaete worm
Nemertean (unidentified)	Nemertean worm
<i>Nereis procera</i>	Polychaete worm
<i>Nereis vexillosa</i>	Polychaete worm
<i>Notomastus tenuis</i>	Polychaete worm
<i>Nucella lamellosa</i>	Gastropod / Frilled dogwinkle
<i>Odostomia</i> sp. (unidentified)	Gastropod
<i>Onchidoris bilamellata</i>	Gastropod / Barnacle-eating nudibranch
<i>Onuphis elegans</i>	Polychaete worm
<i>Onuphis iridescentis</i>	Polychaete worm
<i>Owenia fusiformis</i>	Polychaete worm
<i>Pagurus</i> spp.	Hermit crab
<i>Paracalliopiella pratti</i>	Amphipod

Scientific Name	Common Group / Name
<i>Phoronopsis harmeri</i>	Phoronid worm
<i>Phyllodoce maculata</i>	Polychaete worm
<i>Pholoe minuta</i>	Polychaete worm
<i>Photis</i> spp.	Amphipod
<i>Pinnixia faba</i>	Crab / Pea crab
<i>Pisaster ochraceus</i>	Seastar / Purple or ochre star
<i>Pinnixia schmitti/occidentalis</i>	Crab / Pea crab
<i>Platynereis bicanaliculata</i>	Polychaete worm
<i>Polydora brachycephala</i>	Polychaete worm
<i>Polydora cardalia</i>	Polychaete worm
<i>Pododesmus cepio</i>	Bivalve / Jingle shell
<i>Polydora columbiana</i>	Polychaete worm
<i>Podarkeopsis glabrus</i>	Polychaete worm
<i>Pontogeneia ivanovi</i>	Amphipod
<i>Polinices lewisii</i>	Gastropod / Moon snail
<i>Polydora quadrilobata</i>	Polychaete worm
<i>Protothaca staminea</i>	Bivalve / Pacific littleneck
<i>Prionospio steenstrupi</i>	Polychaete worm
<i>Pseudopolydora kempj japonica</i>	Polychaete worm
<i>Ptilohyale plumulosa</i>	Amphipod
<i>Pugettia gracilis</i>	Crab / Graceful kelp crab
<i>Saxidomus giganteus</i>	Bivalve / Butter clam
<i>Scoloplos acmeceps</i>	Polychaete worm
<i>Spio filicornis</i>	Polychaete worm
<i>Sphaeromid</i> isopods	Isopod
<i>Spiochaetopterus tube</i>	Polychaete worm
<i>Leptochelia dubia</i>	Tanaid
<i>Tellina modesta</i>	Bivalve / Plain tellin
<i>Tonicella lineata</i>	Chiton / Lined chiton
<i>Tresus capax</i>	Bivalve / Fat gaper
<i>Transennella tantilla</i>	Bivalve
<i>Urticina</i> sp.	Anemone

A reconnaissance level survey of the nearshore marine environment was conducted by DEA on February 1, 2010. The survey was timed to occur during a low tide of +1.3 that occurred at 3:05 PM. Photos taken during this and other site visits are included in **Appendix B**.

The seawall at Point Wells is composed of riprap, sheetpile, concrete, and wood. Use of the seawall by marine organisms is extremely variable. No marine organisms were noted attached or utilizing the seawall composed of steel, concrete, or treated wood planks. However, the riprap seawall was generally encrusted with barnacles (acorn and thatched), as well as mussels, chitons, limpets, snails, anemones, amphipods, rock weed, and a few unidentified red/brown algae. Based on the presence of seashells along the beach, mollusks in the project vicinity include pacific oyster, cockle, butter clam, horse clam, littleneck, mossy chiton, and moon snail. The

predominance of the upper nearshore beach is dominated by sand and therefore not typical habitat for most clam species. However, a rocky area near the southeast shoreline is dominated by gravels, and butter and littleneck clams are extremely abundant within that area. This area is closed to the harvest of clams due to marine biotoxins and pollution. Seastars (mottled) and jellyfish (lion's mane) were also observed during the site visit.

5.8 AMPHIBIANS AND REPTILES

The WSGA data for amphibians and reptiles contain limited site-specific occurrence data, but include a map for each species outlining its core and peripheral zones (Dvornich, McAllister, and Aubry 1997). These zones represent the potential distribution of each species based on the presence of suitable habitat within each zone. Therefore, the species outlined below in **Table 5** have the potential to occur in the general project area if suitable habitat is present.

Table 5: Amphibians and Reptiles

Common Name	Scientific Name
Northwestern Salamander	<i>Ambystoma gracile</i>
Long-toed Salamander	<i>Ambystoma macrodactylum</i>
Pacific Giant Salamander	<i>Dicamptodon tenebrosus</i>
Roughskin Newt	<i>Taricha granulosa</i>
Western Redback Salamander	<i>Plethodon vehiculum</i>
Ensatina	<i>Ensatina eschscholtzii</i>
Pacific Treefrog	<i>Hyla regilla</i>
Red-legged Frog	<i>Rana aurora</i>
Bullfrog	<i>Rana catesbeiana</i>
Slider	<i>Trachemys scripta</i>
Northern Alligator Lizard	<i>Elgaria coerulea</i>
Western Terrestrial Garter Snake	<i>Thamnophis elegans</i>
Northwestern Garter Snake	<i>Thamnophis ordinoides</i>
Common Garter Snake	<i>Thamnophis sirtalis</i>

Aside from the ditch along the northern edge of the project site, no potential amphibian habitat is present on the developed portion of Paramount Petroleum west of the BNSF railroad tracks. Reptiles that could potentially utilize the developed portion of the project site include garter snakes and alligator lizards.

5.9 FISHERIES RESOURCES

A review of existing resource data indicates that streams in the immediate project vicinity do not contain fisheries resources. However, the nearshore marine waters of Puget Sound contain a wide variety of fisheries resources. The use of fish within the nearshore marine waters was assessed by reviewing beach seine data from Richmond Beach, which is located less than 0.5 mile south of the project area. Beach seine data was collected between May and October 2001, and April and December 2002 (Brennan et al. 2004). A summary of this data is provided in **Table 6**.

Table 6: Richmond Beach and Total Fish Capture Summary

#	Common Name	2001 Total Captured At Richmond Beach	2001 Total Captured in Overall Study Area	2002 Total Captured At Richmond Beach	2002 Total Captured in Overall Study Area
1.	Chinook Salmon	57	1066	124	1354
2.	Coho Salmon	23	234	102	1053
3.	Chum Salmon	676	2556	2413	24740
4.	Sockeye Salmon	39	113	4	4
5.	Atlantic Salmon	0	1	0	0
6.	Pink Salmon	0	0	775	2518
7.	Steelhead Trout	1	7	0	2
8.	Sea-run Cutthroat Trout	2	211	6	133
9.	Bull Trout	0	0	0	1
10.	Shiner Perch	1439	33659	2073	38965
11.	Striped Perch	29	325	20	179
12.	Pile Perch	4	68	19	188
13.	Butter Sole	Not Listed	Not Listed	0	2
14.	English Sole	94	1569	214	1131
15.	Rock Sole	19	632	19	213
16.	Starry Flounder	2	334	28	794
17.	Speckled Sanddab	1	88	52	161
18.	C-O Sole	2	39	6	9
19.	Sand Sole	0	7	4	50
20.	Flathead Sole	0	3	Not Listed	Not Listed
21.	Pacific Sanddab	0	2	0	15
22.	Sanddab spp.	1	14	0	2
23.	Unidentified Sanddab	0	105	Not Listed	Not Listed
24.	Unidentified Flatfish	55	119	2	109
25.	Staghorn Sculpin	49	1500	38	1633
26.	Great Sculpin	5	99	14	43
27.	Northern Sculpin	1	42	0	10
28.	Buffalo Sculpin	0	33	4	109
29.	Silverspotted Sculpin	0	9	3	6
30.	Cabezon	0	6	0	3
31.	Tidepool Sculpin	0	5	0	22
32.	Padded Sculpin	Not Listed	Not Listed	1	146
33.	Sailfin Sculpin	0	2	0	2
34.	Red Irish Lord	0	2	Not Listed	Not Listed
35.	Unidentified Sculpin	0	17	26	166
36.	Sand Lance	0	1513	36	1176
37.	Surf Smelt	2	260	1	110
38.	Herring	7	424	13	343
39.	Penpoint Gunnel	10	135	42	90
40.	Crescent Gunnel	0	99	8	80
41.	Saddleback Gunnel	1	27	3	178
42.	Gunnel spp.	6	9	Not Listed	Not Listed
43.	Tubesnout	53	508	135	553
44.	Threespine Stickleback	3	117	3	67
45.	Bay Pipefish	1	24	0	56

#	Common Name	2001 Total Captured At Richmond Beach	2001 Total Captured in Overall Study Area	2002 Total Captured At Richmond Beach	2002 Total Captured in Overall Study Area
46.	Skate spp.	1	6	Not Listed	Not Listed
47.	Big Skate	0	5	3	9
48.	Rockfish spp.	0	1	0	2
49.	Unidentified Snailfish	0	2	Not Listed	Not Listed
50.	Brown Rockfish	Not Listed	Not Listed	0	2
51.	Sturgeon Poacher	0	3	0	33
52.	Bay Goby	0	2	Not Listed	Not Listed
53.	Kelp Greenling	0	1	Not Listed	Not Listed
54.	Whitespotted Greenling	0	4	4	14
55.	Unidentified Greenling	0	13	1	5
56.	Pacific Cod	0	3	Not Listed	Not Listed
57.	Pacific Tomcod	1	5	3	7
58.	Pacific Midshipman	0	2	0	107
59.	Rat Fish	0	1	0	13
60.	Northern Spearnose	Not Listed	Not Listed	0	1
61.	Snake Prickleback	0	118	0	24
62.	Walleye Pollack	1	1	Not Listed	Not Listed
	Total Captured	2585	46150	6196	78428

Many of these species are year-round residents of the marine nearshore environment. However, all anadromous salmonids make at least one round-trip migration between their natal stream and marine waters. The timing of these migrations is variable, as is the amount of available data on when, where, and for how long they utilize marine waters. **Table 7** outlines the time period certain species/life-histories could be present near Point Wells. Although data is available for some species, it is not available for all species/life-histories, and use of a specific area can be highly variable. Furthermore, most surveys are seasonal and do not occur year-round. Therefore, the time-periods outlined below in **Table 7** are general and not absolute. Generally speaking, juvenile salmonids occupy nearshore Puget Sound waters for at least six months of the year (April through September), with a peak abundance from May through July (NMFS 2004).

Table 7: Salmonid Timing

Common Name	Project Vicinity	Puget Sound	Comment
Adult Chinook Salmon	July - November	Spring - Fall.	Multiple runs (spring, summer, and fall) present. Year round for blackmouth.
Juvenile Chinook Salmon	May - October	December - October	Peak June and July.
Adult Coho Salmon	September - October	Late fall - early Winter.	Some adults start arriving early summer.
Juvenile Coho Salmon	May - August	April - September	
Adult Chum Salmon	October - November	October - January	Late runs south sound.
Juvenile Chum Salmon	May - June	January - July	Peak is earlier near estuaries, typically occurring from March to May.
Adult Sockeye Salmon	June - July	June - August	
Juvenile Sockeye Salmon	June		
Adult Pink Salmon	August - September	July - August	Most abundant during odd years.
Juvenile Pink Salmon	April	March - May	Most abundant during even years.

Common Name	Project Vicinity	Puget Sound	Comment
Adult Steelhead Trout	February - March	Snohomish River summer-run return May – Oct, winter- run return Nov – April.	Timing mentioned for project vicinity is based on fish returning to Lake Washington and being observed at the Ballard Locks.
Juvenile Steelhead Trout	April - July		Snohomish estuary: March - May
Adult Sea-run Cutthroat Trout	April - August	Year-round	Reported to rarely overwinter in saltwater.
Juvenile Sea-run Cutthroat Trout	Early October and late June	Year-round	
Adult Bull Trout	March – July	Year-round	Most abundant when prey items peak, such as juvenile salmonids and forage fish. Some may overwinter in lower river reaches and estuaries. Probably fewest present between September – October since that is peak spawning time.
Sub-adult Bull Trout	March - July	Year-round	

5.10 BIRDS

Based on a review of WSGA data, 78 bird species could potentially nest in the general project vicinity in or adjacent to T27N R03E (Smith et al. 1997). This determination is based on combining confirmed, probable, and possible breeding evidence. It is important to note that the species listed in **Table 8** are not necessarily associated with the project area, but could potentially utilize the project vicinity for nesting, foraging, or migrating where suitable habitat is present. As an example, a large percentage of the waterfowl breeding data is from Lake Ballinger, which is over 2.5 miles east of the project site; but this is close enough to the project area to be included.

Table 8: Breeding Bird Summary for T27N R03E and Surrounding Area

#	Common Name	Scientific Name
1.	Pied-billed Grebe	<i>Podilymbus podiceps</i>
2.	Great Blue Heron	<i>Ardea herodias</i>
3.	Green Heron	<i>Butorides virescens</i>
4.	Canada Goose	<i>Branta canadensis</i>
5.	Mallard	<i>Anas platyrhynchos</i>
6.	Blue-winged Teal	<i>Anas discors</i>
7.	Northern Shoveler	<i>Anas clypeata</i>
8.	Gadwall	<i>Anas strepera</i>
9.	Bald Eagle	<i>Haliaeetus leucocephalus</i>
10.	Cooper's Hawk	<i>Accipiter cooperii</i>
11.	Red-tailed Hawk	<i>Buteo jamaicensis</i>
12.	Ring-necked Pheasant	<i>Phasianus colchicus</i>
13.	California Quail	<i>Callipepla californica</i>
14.	Virginia Rail	<i>Rallus limicola</i>
15.	American Coot	<i>Fulica americana</i>
16.	Killdeer	<i>Charadrius vociferus</i>
17.	Spotted Sandpiper	<i>Actitis macularia</i>
18.	Glaucous-winged Gull	<i>Larus glaucescens</i>
19.	Rock Dove	<i>Columba livia</i>
20.	Band-tailed Pigeon	<i>Columba fasciata</i>
21.	Mourning Dove	<i>Zenaida macroura</i>
22.	Great Horned Owl	<i>Bubo virginianus</i>

#	Common Name	Scientific Name
23.	Barred Owl	<i>Strix varia</i>
24.	Vaux's Swift	<i>Chaetura vauxi</i>
25.	Anna's Hummingbird	<i>Calypte anna</i>
26.	Rufous Hummingbird	<i>Selasphorus rufus</i>
27.	Downy Woodpecker	<i>Picoides pubescens</i>
28.	Northern Flicker	<i>Colaptes auratus</i>
29.	Pileated Woodpecker	<i>Dryocopus pileatus</i>
30.	Olive-sided Flycatcher	<i>Contopus borealis</i>
31.	Western Wood-Pewee	<i>Contopus sordidulus</i>
32.	Willow Flycatcher	<i>Empidonax traillii</i>
33.	Pacific-slope Flycatcher	<i>Empidonax difficilis</i>
34.	Tree Swallow	<i>Tachycineta bicolor</i>
35.	Violet-green Swallow	<i>Tachycineta thalassina</i>
36.	Cliff Swallow	<i>Hirundo pyrrhonota</i>
37.	Barn Swallow	<i>Hirundo rustica</i>
38.	Steller's Jay	<i>Cyanocitta stelleri</i>
39.	American Crow	<i>Corvus brachyrhynchos</i>
40.	Black-capped Chickadee	<i>Parus atricapillus</i>
41.	Chestnut-backed Chickadee	<i>Parus rufescens</i>
42.	Bushtit	<i>Psaltirparus minimus</i>
43.	Red-breasted Nuthatch	<i>Sitta canadensis</i>
44.	Brown Creeper	<i>Certhia americana</i>
45.	Bewick's Wren	<i>Thryomanes bewickii</i>
46.	Winter Wren	<i>Troglodytes troglodytes</i>
47.	Marsh Wren	<i>Cistothorus palustris</i>
48.	Golden-crowned Kinglet	<i>Regulus satrapa</i>
49.	Swainson's Thrush	<i>Catharus ustulatus</i>
50.	American Robin	<i>Turdus migratorius</i>
51.	Cedar Waxwing	<i>Bombycilla cedrorum</i>
52.	European Starling	<i>Sturnus vulgaris</i>
53.	Hutton's Vireo	<i>Vireo huttoni</i>
54.	Warbling Vireo	<i>Vireo gilvus</i>
55.	Red-eyed Vireo	<i>Vireo olivaceus</i>
56.	Orange-crowned Warbler	<i>Vermivora celata</i>
57.	Yellow Warbler	<i>Dendroica petechia</i>
58.	Black-throated Gray Warbler	<i>Dendroica nigrescens</i>
59.	Common Yellowthroat	<i>Geothlypis trichas</i>
60.	Wilson's Warbler	<i>Wilsonia pusilla</i>
61.	Western Tanager	<i>Piranga ludoviciana</i>
62.	Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>
63.	Spotted Towhee	<i>Pipilo maculatus</i>
64.	Savannah Sparrow	<i>Passerculus sandwichensis</i>
65.	Song Sparrow	<i>Melospiza melodia</i>
66.	White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
67.	Dark-eyed Junco	<i>Junco hyemalis</i>
68.	Red-winged Blackbird	<i>Agelaius phoeniceus</i>
69.	Brewer's Blackbird	<i>Euphagus cyanocephalus</i>
70.	Brown-headed Cowbird	<i>Molothrus ater</i>
71.	Bullock's Oriole	<i>Icterus bullockii</i>
72.	Purple Finch	<i>Carpodacus purpureus</i>
73.	House Finch	<i>Carpodacus mexicanus</i>
74.	Red Crossbill	<i>Loxia curvirostra</i>
75.	Pine Siskin	<i>Carduelis pinus</i>
76.	American Goldfinch	<i>Carduelis tristis</i>

#	Common Name	Scientific Name
77.	Evening Grosbeak	<i>Coccothraustes vespertinus</i>
78.	House Sparrow	<i>Passer domesticus</i>

Use of the adjacent marine waters by birds was assessed by reviewing the *Report of Marine Bird and Mammal Component, Puget Sound Ambient Monitoring Program for July 1992 to December 1999 Period* (Nysewander et al 2005). **Table 9** summarizes the data based on summer and winter aerial surveys representing density within two-minute grid cell (summer) and one-minute cells (winter) that encompass the marine waters adjacent to Point Wells. Winter density within **Table 9** includes data from one- or two-minute grid cells. When the winter survey data was presented using one-minute cells, the cell location was divided at the tip of Point Wells. The first density range represents Point Wells south and the second range represents Point Wells north. When two-minute grid cells were used, only one number range is presented in **Table 9**. All densities represent animals per kilometer squared.

Table 9: Point Wells Vicinity Marine Bird Summer and Winter Density

#	Common Name	Summer Density	Winter Density
1.	All Species	75 – 200	200 – 400
2.	Gull Density	50 – 100	25 - 50
3.	Heermann's Gull	None	None
4.	California Gull	0 – 5	None
5.	Bonapartes Gull	None	None
6.	Caspian Tern	0 – 5	None
7.	Rhinoceros Auklet	None	None
8.	Common Murre	None	0 - 5
9.	Pigeon Guillemot	5 – 10	0 - 2
10.	Marbled Murrelet	None	None
11.	Ancient Murrelet	No data	None
12.	Scoter	None	25 – 50 and 0 – 10
13.	Canada Goose	None	None
14.	Merganser (3 spp.)	None	5 - 10
15.	Hooded Merganser	No data	None
16.	Harlequin Duck	None	0 – 10 and None
17.	Cormorant	None	10 - 25
18.	Great Blue Heron	2 – 5	None
19.	Bufflehead	No data	0 – 10 and 10 - 25
20.	Goldeneye	No data	25 – 50 and 50 - 100
21.	Scaup (2 spp.)	No data	None
22.	Ruddy Duck	No data	None
23.	Canvasback	No data	None
24.	Oldsquaw	No data	None
25.	Western Grebe	No data	10 – 25 and 100 - 1344
26.	Horned Grebe	No data	1 - 2
27.	Red-Necked Grebe	No data	0 - 2
28.	Pacific Loon	No data	None
29.	Red-Throated Loon	No data	None
30.	Common Loon	No data	None

The summer surveys documented that gulls and terns are the most common marine species in Puget Sound, representing 73 percent of the total observed. Alcids are the second most common group, representing 10 percent of the total observed. The remainder included duck or geese at 8 percent, cormorants at 4 percent, heron at 3 percent, and other species at 2 percent.

The winter surveys documented that dabbling duck or goose are the most common species in Puget Sound, representing 37 percent of the total observed. Diving ducks are the second most common group, representing 31 percent of the total observed. The remainder included gulls at 12 percent, shorebirds at 11 percent, grebe or loon at 5 percent, alcid at 2 percent, and cormorant at 2 percent. Winter diving ducks (31 percent of total) were further divided into scoters at 36 percent, bufflehead at 23 percent, goldeneyes at 17 percent, other species at 16 percent, and scaup at 8 percent.

Species observed utilizing the nearshore marine area during the February site visit included numerous pigeons at the primary dock; cormorants on the old dilapidated dock; as well as western grebes, common goldeneye, seagulls, belted kingfisher, and common loons (*Gavia immer*). Arctic loons (*G. arctica*) also utilize the marine nearshore environment during the winter season.

5.11 MAMMALS

5.11.1 Terrestrial Mammals

Based on a review of WSGA data (Johnson and Cassidy 1997), twenty mammals have been documented in or adjacent to Township 27 North Range 03 East (**Table 10**). This list is not all-inclusive and only includes species that were documented in the WSGA database prior to 1997.

Table 10: Mammal Record Summary for T27N R03E

#	Common Name	Scientific Name
1.	Trowbridge's Shrew	<i>Sorex trowbridgii</i>
2.	Shrew-mole	<i>Neotrichus gibbsii</i>
3.	Coast Mole	<i>Scapanus orarius</i>
4.	Townsend's Mole	<i>Scapanus townsendii</i>
5.	Big Brown Bat	<i>Eptesicus fuscus</i>
6.	Mountain Beaver	<i>Aplodontia rufa</i>
7.	Eastern Gray Squirrel	<i>Sciurus carolinensis</i>
8.	Douglas' Squirrel	<i>Tamiasciurus douglasii</i>
9.	Northern Flying Squirrel	<i>Glaucomys sabrinus</i>
10.	Beaver	<i>Castor canadensis</i>
11.	Forest Deer Mouse	<i>Peromyscus keeni</i>
12.	Creeping Vole	<i>Microtus oregoni</i>
13.	Townsend's Vole	<i>Microtus townsendii</i>
14.	Muskrat	<i>Ondatra zibethicus</i>
15.	Pacific Jumping Mouse	<i>Zapus trinotatus</i>
16.	House Mouse	<i>Mus musculus</i>
17.	Black Rat	<i>Rattus rattus</i>
18.	Coyote	<i>Canis latrans</i>
19.	Raccoon	<i>Procyon lotor</i>
20.	Mink	<i>Mustela vison</i>

5.11.2 Marine Mammals

The project area abuts the marine waters of Puget Sound. Eleven species of marine mammals utilize Puget Sound or adjacent marine waters either year-round or seasonally and could, therefore, be present near the project area (**Table 11**). Each of these species has been observed in either the Puget Sound and/or the San Juan Island region during certain periods of the year. Some of these species are common, while others are extremely rare within the inland waters of Puget Sound.

Table 11: Marine Mammals of Puget Sound

#	Common Name	Scientific Name	Comment
1.	Harbor Seal	<i>Phoca vitulina richardsi</i>	Observed near project site. Only year-round resident. Densities at Point Wells during the summer averages 0.1 to 5 animals/km ² , but none were observed during the winter (Nysewander et al 2005).
2.	California Sea Lion	<i>Zalophus californianus</i>	Only males occur in northwest waters.
3.	Stellar Sea Lion	<i>Eumetopias jubatus</i>	Rare in Puget Sound, no breeding rookeries occur in Washington state. Present during fall and winter months.
4.	Northern Elephant Seal	<i>Mirounga angustirostris</i>	Rare but solitary individuals have been sighted in inland waters.
5.	Harbor Porpoise	<i>Phocoena phococena</i>	Not often observed south of Whidbey Island.
6.	Dalls Porpoise	<i>Phocoenoides dalli</i>	More common south of Whidbey Island during winter.
7.	Pacific White-sided dolphin		Extremely rare in Puget Sound, but regularly observed in Strait of Juan de Fuca and San Juan Islands, primarily during the summer and fall. Prefers deeper off-shore waters.
8.	Killer Whale	<i>Orcinus orca</i>	Typically occurs in Puget Sound from June through October, but primarily in the fall (September and October) and winter. J pod is often present during the fall when adult salmon abundance peaks.
9.	Humpback Whale	<i>Megaptera novaeangliae</i>	Most have been observed in Puget Sound between April and July. Rare in Puget Sound and absent during winter.
10.	Gray Whale	<i>Eschrichtius robustus</i>	Generally rare but may now be the most common whale sighted in Puget Sound. Timing is variable but peak is March through May. Forty eight observed in Puget Sound and Hood Canal in 2004 and 2005.
11.	Minke Whale	<i>Balaenoptera acutorostrata</i>	Present year-round but most observed between March and November. Common in San Juan Islands and Strait of Juan de Fuca, but uncommon in Puget Sound. Less than 30 observations in Puget Sound between January 2005 and August 2008.

Based on a review of the *Atlas of Seal and Sea Lion Haulout Sites in Washington* (Jeffries et al. 2000), there are two seal haulout sites within three miles of the project site. The closest is Yellow 'SF' buoy (ID # 352), which is a deep water buoy east of Jefferson Head or approximately two miles west of the project site. This haulout is utilized by harbor seals. The next closest haulout site is at the Wreck/Scuba float (ID # 336), which is located on rafts and floats north of the ferry dock at Edmonds or approximately two and one-half miles north of the project site. This haulout is utilized by California sea lions and harbor seals.

5.11.2.1 Harbor Seal

Harbor seals are members of the true seal family (Phocidae). Harbor seals are the most numerous marine mammal within Puget Sound. In 1999, Jefferies et al. (2003) recorded a mean count of 9,550 harbor seals in Washington's inland marine waters. The population across Washington increased at an average annual rate of 10 percent between 1991 and 1996 and is thought to be stable. The stock is also considered within its Optimum Sustainable Population level.

Harbor seals are non-migratory with local movements associated with such factors as tides, weather, season, food availability, and reproduction. They are not known to make extensive pelagic migrations, although some long distance movement has been reported.

Harbor seals haul out on rocks, reefs, beaches, buoys, and drifting glacial ice; and feed in marine, estuarine, and occasionally fresh waters. Harbor seals display strong fidelity for haulout sites. Group sizes range from small numbers of animals on intertidal rocks to several thousand animals found seasonally in coastal estuaries.

Harbor seals are the only seal that breeds in the inland waters of Washington. Pupping seasons vary by geographic region. Pups are born from June through September, and have weaned by October. Based on currently available data, the level of human-caused mortality and serious injury is less than 10 percent of the potential biological removal (PBR) of 771 harbor seals per year (Caretta et al. 2003).

5.11.2.2 California Sea Lion

California sea lions are members of the family Otariidae or eared seals (sea lions and fur seals). They do not breed in Puget Sound. Breeding areas are on islands located in southern California, western Baja California, and the Gulf of California.

The U.S. stock was estimated to be approximately 238,000 animals in 2006. California sea lions were unknown in Puget Sound until approximately 1979 (Steiger and Calambokidis 1986). Everitt et al. (1980) reported the initial occurrence of large numbers at Port Gardner, just north of Everett (in northern Puget Sound), in the spring of 1979. The number of California sea lions in the San Juan Islands and the adjacent Strait of Juan de Fuca totaled fewer than 3,000 in the mid-1980s (Bigg 1985, Gearin et al. 1986). More recently, 3,000 to 5,000 animals are estimated to move into northwest waters (both Washington and British Columbia) during the fall (September) and remain until the late spring (May) when most return to breeding rookeries in California and Mexico. Peak counts of over 1,000 animals have been made in Puget Sound (Jeffries et al. 2000).

California sea lions do not avoid areas with heavy or frequent human activity, but rather may approach certain areas to investigate. This species typically does not flush from a buoy or haulout if approached. They are known to capitalize on reoccurring food sources (such as salmon) and are infamous for eating listed salmonids at manmade bottleneck areas such as the Hiram M. Chittenden Locks in Seattle and at the Bonneville Dam on the Columbia River. This species is difficult to remove and does not respond well to hazing efforts (Brown et al. 2007).

5.11.2.3 Northern Elephant Seal

Northern elephant seals are the largest pinniped found in Puget Sound. Populations of northern elephant seals in the United States and Mexico are the offspring of a few hundred survivors

remaining after hunting nearly led to the species extinction (Stewart et al. 1994). Elephant seals present in Puget Sound are considered part of the California breeding stock (Carretta et al. 2007a). The California breeding stock is considered an isolated population from the Mexican stock. Northern elephant seals breed and give birth primarily on islands off California and Mexico from December through March. After their winter breeding season and annual molt cycles, individuals seasonally disperse northward along the Oregon and Washington coasts, and into the Strait of Juan de Fuca.

In recent years, pups have been seen at beaches at Destruction, Protection, and Smith/Minor Islands in the Strait of Juan de Fuca (Jeffries et al. 2000). The WDFW has identified at least seven haulout sites in inland Washington waters. There are several haulout sites in the Strait of Juan de Fuca where small numbers frequent and pupping occurs. The Whale Museum occasionally reports incidental observations of northern elephant seal individuals throughout Puget Sound. This species has been considered abundant and increasing within its range since the early 1990's (Calambokidis and Baird 1994). Abundance estimates for Puget Sound waters are not available due to the infrequency of sightings and the low numbers encountered.

5.11.2.4 *Steller Sea Lion*

Steller sea lions primarily use haulout sites on the outer coast of Washington and in the Strait of Juan de Fuca along Vancouver Island in British Columbia. Only sub-adults or non-breeding adults may be found in Puget Sound and San Juan Islands (Pitcher et al. 2007). Recent estimates are that 1,000 to 2,000 individuals enter the Strait of Juan de Fuca during the fall and winter months, but there are no known rookeries in Washington (Jeffries et al. 2000).

A few Steller sea lions can be observed year around in Puget Sound, although most of the breeding age adults return to the rookeries off Oregon and British Columbia during the spring and summer. Adult males and juveniles disperse widely and travel great distances outside of the breeding season. These are typically the animals observed in Puget Sound. They are usually observed in small groups of one to four individuals.

Steller sea lion abundance is variable, with a minimum seasonal estimate of 1,000-2,000 individuals present or passing through Strait of Juan de Fuca in the fall and winter months. Haulout sites have increased in recent years and include most navigation buoys. Haulout sites in Puget Sound include Port Gardner near Everett, Shilshole Bay adjacent to Seattle, Toliva Shoals buoy south of Steilacoom, and buoys off McNeil and Eagle Islands.

5.11.2.5 *Harbor Porpoise*

Harbor porpoise are found in coastal and inland waters of the eastern North Pacific Ocean from Point Barrow, Alaska, south to Point Conception, California (Gaskin 1984). Although harbor porpoises have been spotted in deep water, they tend to remain in shallower shelf waters (<150 meters) where they are most often observed in small groups of one to eight animals (Baird 2003).

Little information regarding food habits of harbor porpoise is available for British Columbia or inland Washington waters (Hall 2004). Walker et al. (1998) examined stomach contents for 26 harbor porpoises collected over a seven-year period (1990-1997) in Washington and British Columbia. Documented prey species included juvenile blackbelly eelpout, opal squid, Pacific herring, walleye pollock, Pacific hake, eulachon, and Pacific sanddab. Harbor porpoises are

opportunistic feeders, with prey species varying based on seasonal abundance. Herring and hake may comprise a fundamental component of harbor porpoise diet and may be locally important as a year-round food source. Harbor porpoise may inhabit particular locations and prey on herring as they become available. Species such as juvenile blackbelly eelpout, opal squid, and sand lance may be seasonally important. Small numbers of harbor porpoise are eaten by transient killer whales.

Mean abundance estimates based on 2002 and 2003 aerial surveys conducted in the Strait of Juan de Fuca, San Juan Islands, Gulf Islands, and Strait of Georgia is 10,682 (J. Laake, unpubl. data as cited in Carretta et al. 2007b). Abundance estimates of harbor porpoise for the Strait of Juan de Fuca and the San Juan Islands in 1991 were approximately 3,300 animals (Calambokidis et al. 1993). Harbor porpoise were once considered common in southern Puget Sound; however, there has been a significant decline in sightings since the 1940s.

The last comprehensive surveys of Puget Sound in 1994 produced no harbor porpoise observations (Osmek et al. 1994). Surveys conducted as part of the marine mammal component of the Puget Sound Ambient Monitoring Program (PSAMP) detected no harbor porpoises in central and southern Puget Sound from 1992 to 1998. The apparent decline in harbor porpoises observed since the 1940s may be due to by-catch from gill net fisheries coupled with the sharp decline of the herring fishery. Harbor porpoise are considered vulnerable to human activities (Calambokidis and Baird 1994) and avoid vessel traffic. Contaminants, as well as unusual mortality events and competition with Dall's porpoise, may also be factors in their decline.

During winter aerial surveys conducted from 1993 to 1998, 21 individuals were observed in Northern Puget Sound. No observations were documented in central and southern Puget Sound during this same time period. From 1999 to 2008, winter aerial surveys detected 73 individuals in Northern Puget Sound, as well as 12 and 6 individuals in Central and Southern Puget Sound, respectively. Summer observations from 1992 to 1999 yielded a total of 32 individuals and one individual in Northern and Southern Puget Sound, respectively. The majority of winter and summer harbor porpoise observations from 1992 to 2008 occurred in the marine waters surrounding the San Juan Islands, including the Strait of Juan de Fuca, Strait of Georgia, Rosario Strait, Haro Strait, and Boundary Pass.

Research conducted in the southern Vancouver Island waters indicated a marked increase and greatest abundance in harbor porpoise numbers from April to October (673 animals), with peak abundance in August and September (Hall 2004). Numbers were considerably lower during other months of the year, with 208 animals observed from November to March. During a 12-month line transect survey period, harbor porpoise group sizes ranged from one to five animals, with a mean annual group size of 1.89. The sighting frequency of harbor porpoise along the 12-month line transect survey was greatest at water depths less than 150 meters. The highest numbers of harbor porpoise were observed at water depths ranging from 61 to 100 meters. Although harbor porpoise have been observed in waters exceeding depths of 150 meters, they are primarily found in areas with water depths less than 150 meters and topography consisting of submarine shelves.

Harbor porpoise appear to be rebounding and re-colonizing Puget Sound, perhaps in response to a reduction in fisheries and fewer commercial gill-netters resulting from declining salmon populations. In addition, there have been recent confirmed sightings of harbor porpoise in southern Puget Sound (WDFW 2008). Recent data suggests increasing numbers of harbor

porpoises in central and southern Puget Sound since 1999. Harbor porpoise are common in the Strait of Juan de Fuca and south into Admiralty Inlet (near Port Townsend), but not common south of Admiralty Inlet. Harbor porpoise occur year-round and breed in the waters around the San Juan Archipelago and north into Canadian waters (Calambokidis and Baird 1994).

5.11.2.6 *Dall's Porpoise*

Dall's porpoise occur in the North Pacific Ocean and are divided into two stocks: 1) California, Oregon, and Washington; and 2) Alaska. During a ship line-transect survey conducted in 2005, Dall's porpoise was the most abundant cetacean species off the Oregon and Washington coast (Forney 2007). Dall's porpoise are migratory and appear to have predictable seasonal movements driven by changes in oceanographic conditions (Green et al. 1993).

Dall's porpoise feed mainly on small schooling fishes and cephalopods, including herring, anchovies, sardines, mackerels, sauries, octopuses, squid, and cuttlefish (Miller 1988). They often chase fish at the water surface, and have been observed cooperatively herding prey when herring balls were present. This species may also target deeply distributed single prey items by performing prolonged deep dives lasting up to seven minutes.

Aerial surveys conducted from 1992 to 1999 by Nysewander et al. (2005) indicated that Dall's porpoise favored certain areas in the Puget Sound, particularly Haro Strait and the central portion of the Strait of Juan de Fuca during both summer and winter. Dall's porpoises entered southern and central Puget Sound in larger numbers during winter, reaching up into Saratoga Passage, as well as south of the Narrows near Tacoma. During winter, numbers as high as 21-25 were observed in Colvos Passage on the West side of Vashon Island. Groups of one to two animals and a group of six to ten animals were also observed south of the Tacoma Narrows Bridge, north of Penrose Point in Carr Inlet and Henderson Bay. During summer, Dall's porpoises are much less common, with observations ranging from groups of one to two animals primarily in the northern third of Puget Sound. Based on incidental observations from the PSAMP during July aerial surveys from 1992-1999, groups of one to two animals were observed as far south as Bainbridge Island.

The California, Oregon and Washington stock mean abundance estimate based on 2001 and 2005 ship surveys is 57,549 Dall's porpoise (Barlow 2003, Forney 2007). Estimated abundance of Dall's porpoise in the San Juan Island region was 133 animals, while estimated abundance in the Strait of Juan de Fuca was 3,015 animals (Calambokidis and Baird 1994). The Dall's porpoise is found year-round in low numbers in Puget Sound, ranging south through Admiralty Inlet into central and southern Puget Sound. The population of Washington's inland waters was most recently estimated at 900 individuals (Calambokidis et al. 1997). Prior to the 1940s, Dall's porpoise were not reported in Puget Sound. In recent years, the number of observations and confirmed reports has increased. Animals have been seen as far south as Tacoma Narrows, Hartstein Island, Key Peninsula, and Fox Island (Nysewander et al. 2005).

5.11.2.7 *Pacific White-sided Dolphin*

Pacific white-sided dolphins are divided into northern and southern stocks comprising two discrete, non-contiguous areas: 1) waters off California, Oregon, and Washington; and 2) Alaskan waters (Carretta et al. 2007b). Pacific white-sided dolphins are occasionally seen in the northernmost part of the Strait of Georgia and in western Strait of Juan de Fuca, but are generally

only rare visitors to this area (Calambokidis and Baird 1994). This species is rarely seen in Puget Sound. Pacific white-sided dolphins have been documented primarily in deep, offshore areas (Calambokidis et al. 2004). The Pacific white-sided dolphin is capable of diving up to six minutes to feed, preying on small schooling fish including capelin, sardines, and herring (Reeves et al. 2002).

Pacific white-sided dolphins have been reported to be regular summer and fall inhabitants of the Strait of Juan de Fuca and San Juan Islands (specifically Haro Strait) (Osborne et al. 1988), but extremely rare in Puget Sound. The Pacific white-sided dolphin is primarily a pelagic species that feeds along the continental slope or off the shelf. Ship transect surveys conducted between 1995 and 2002 off the northern Washington coast documented Pacific white-sided dolphins far from shore (>40 km) and in deep waters (>200 m) (Calambokidis et al. 2004).

The California, Oregon, and Washington stock mean abundance estimate based on the two most recent ship surveys is 25,233 Pacific white-sided dolphins (Forney 2007). This abundance estimate is based on two summer/autumn shipboard surveys conducted within 300 nautical miles of the coasts of California, Oregon, and Washington in 2001 and 2005. Surveys in Oregon and Washington coastal waters resulted in an estimated abundance of 7,645 animals. Fine-scale surveys in Olympic Coast slope waters and Olympic Coast National Marine Sanctuary resulted in an estimated abundance of 1,196 and 1,432 animals, respectively. There are no known estimated numbers for Washington's inland waters. Pacific white-sided dolphins were not observed in Puget Sound during yearly summer and winter aerial surveys from 1992 to 1999, and winter aerial surveys from 2000 to 2008, conducted as part of the PSAMP (Nysewander et al. 2005, WDFW 2008). During aerial surveys conducted as part of the PSAMP from 1992 to 2008, three Pacific white-sided dolphins were observed in the Strait of Juan de Fuca during the summer of 1995.

5.11.2.8 Killer Whale

The killer whale is the largest member of the dolphin family (Delphinidae) and occurs in most marine waters of the world. Killer whales are distinct among all cetaceans with their black-and-white coloration, with characteristic gray or white saddle patches behind the dorsal fin, and white eye patches. Killer whales live in family groups called pods, are highly social, and communicate with a highly developed acoustic sensory system that is also used to navigate and find prey. Vocal communication is particularly advanced in killer whales and is an essential element of the species social structure.

Two sympatric ecotypes of killer whales are found within this region—transient and resident. These types vary in diet, distribution, acoustic calls, behavior, morphology, and coloration (Ford et al. 2000). The ranges of transient and resident killer whales overlap; however, little interaction and high reproductive isolation occurs among the two ecotypes. Resident killer whales are primarily piscivorous; whereas, transients primarily feed on marine mammals, especially harbor seals. Resident killer whales also tend to occur in larger (10 to 60 individuals), stable family groups, known as pods; whereas transients occur in smaller (less than 10 individuals), less structured pods.

One stock of transient killer whale—the ‘West Coast Transients’—occurs in Washington State. This stock ranges from southern California to southeast Alaska and is distinguished from two

other Eastern North Pacific transient stocks that occur further north, the ‘AT1’ and the ‘Gulf of Alaska’ transient stocks (Angliss and Outlaw 2005). This separation was based on variations in acoustic calls and genetic distinctness. West Coast Transients primarily forage on harbor seals (Ford et al. 1999), but other species such as porpoises and sea lions are also taken (NMFS 2008a).

Two stocks of resident killer whales occur in Washington State—the Southern Resident and Northern Resident stocks. Southern Residents occur within Puget Sound, in the Strait of Juan de Fuca, Strait of Georgia, and in coastal waters off Washington and Vancouver Island, British Columbia (Ford et al. 2000). Northern Residents occur primarily in inland and coastal British Columbia and Southeast Alaska waters and rarely venture into Washington State waters. Little interaction or gene flow is known to occur between the two resident stocks.

The Southern Residents live in three family groups known as the J, K, and L pods. The entire southern resident population has been monitored since 1973 (Krahn et al. 2004). Individual whales are identified through photographs of unique saddle patch and dorsal fin markings. Each Southern Resident pod has a distinctive dialect or vocalizations and calls can travel ten miles or more underwater. The Southern Residents forage primarily on salmon, with Chinook salmon considered the major prey in the Puget Sound region in late spring through the fall (NMFS 2008a). Other prey identified includes chum, other salmonids, herring, and rockfish. Killer whale hearing is well developed for their complex underwater communication structure. Southern Residents are highly vocal, while transients limit their use of vocalization and may travel silently.

Small population numbers make Southern Residents vulnerable to inbreeding depression and catastrophic events such as disease or a major oil spill. Ongoing threats to Southern Residents include declining prey resources, environmental contaminants, noise and physical disturbance (Wiles 2004). In Washington’s inland waters, high levels of noise disturbance and potential behavior disruption are due to recreational boating traffic, private and commercial whale watching boats, and commercial vessel traffic. Other potential noise disturbance includes high output military sonar equipment and marine construction. Noise effects may include altered prey movements and foraging efficiency, masking of whale calls, and temporary hearing impairment.

West Coast Transient Stock

The West Coast Transient stock, which includes individuals from California to southeastern Alaska, was estimated to have a minimum of 314 individuals (including animals identified in Canada) based on whales catalogued by photo identification (Angliss and Outlaw 2005). In addition, another 30 individuals were provisionally classified as transients in this stock. Unlike Southern Residents, re-sighting transients is more infrequent and; therefore, the population estimate was conservative based on individually identified animals. Human-caused mortality and serious injury are estimated to be zero animals per year and do not exceed the population’s biological removal rate, which is estimated at 3.1 animals.

Southern Resident Stock

In 1974 the population comprised 71 whales, peaked at 97 animals in 1996, and then declined to 79 in 2001 before increasing to 89 animals in 2006 (Carretta et al. 2007a). The population experienced an almost 20 percent decline from 1996 to 2001 (NMFS 2008a). As of November 7, 2007, the population collectively numbers 88 individuals (Center for Whale Research 2008). As

of November 7, 2007, J pod has 26 members, K pod has 19 members, and L pod has 43 members.

The Southern Residents have declined in the past ten years due to a decrease in birth rates and an increase in mortalities, especially among the L pod (Krahn et al. 2004). There are a limited number of reproductive-age Southern Resident males, and several females of reproductive age are not having calves. Three major threats were identified in the Endangered Species Act (ESA) listing: reduced quantity and quality of prey; persistent pollutants that could cause immune or reproductive system dysfunction; and effects from vessels and sound (NMFS 2008a). Other threats are demographics, small population size, and vulnerability to oil spills. Historically, declines in the Southern Resident population were due to shooting by fishermen, whalers, sealers, and sportsmen largely due to their interference with fisheries (Wiles 2004) and the aquarium trade, which is estimated to have taken a significant number of animals from 1967 to 1973 (Ford et al. 1994).

The estimated annual level of human-caused mortality and serious injury is 0.2 animals per year, which exceeds the PBR of 0.18 animals (Caretta et al. 2007b). The 0.2 rate reflects a vessel strike of one animal.

Killer whales are protected under the Marine Mammal Protection Act (MMPA) of 1972. The West Coast Transient stock is not designated as depleted under the MMPA or listed as “threatened or “endangered” under the ESA. Because the estimated level of human-caused mortality and serious injury (0 animals per year) does not exceed the PBR rate (3.1), the stock is not classified as strategic.

The Eastern North Pacific Southern Resident stock was declared depleted under the MMPA in May 2003 (68 FR 31980). The NMFS then announced preparation of a conservation plan to restore the stock to its optimal sustainable population.

On November 18, 2005, the Southern Resident stock was listed as an endangered distinct population segment (DPS) under the ESA (70 FR 69903). On November 29, 2006, the NMFS published a final rule designating critical habitat for the Southern Resident killer whale DPS (71 FR 69054). Both Puget Sound and the San Juan Islands are designated as core areas of critical habitat under the ESA, but areas less than 20 feet deep (relative to extreme high water) are not designated as critical habitat (71 FR 69054). A final recovery plan for Southern Residents was published in January of 2008 (NMFS 2008a). In April 2004, the State upgraded their status to a state endangered species.

West Coast Transient Stock

The West Coast Transients stock occurs in California, Oregon, Washington, British Columbia, and southeastern Alaskan waters. Small groups of one to five individuals are sighted intermittently throughout the year in Puget Sound. They frequent areas near seal rookeries where pups are weaned (Baird and Dill 1995).

Southern Resident Stock

Southern Residents are documented in coastal waters ranging from central California to the Queen Charlotte Islands, British Columbia. Resident killer whales generally spend more time in deeper water and only occasionally enter water less than 15 feet deep (Baird 2000). Distribution

is strongly associated with areas of greatest salmon abundance, with heaviest foraging activity occurring over deep open water and in areas characterized by high-relief underwater topography, such as subsurface canyons, seamounts, ridges, and steep slopes (Wiles 2004).

West Coast Transients are documented intermittently year-round in Washington inland waters. Records from 1976 – 2006 document Southern Residents in the inland waters of Washington during the months of March through June and October through December, with the primary area of occurrence in Puget Sound being north of Admiralty Inlet (The Whale Museum 2008b).

Spring/Summer Distribution

Beginning in May or June and through the summer months, all three pods (J, K, and L) of Southern Residents are typically located in the protected inshore waters of Haro Strait (west of San Juan Island), in the Strait of Juan de Fuca, and Georgia Strait near the Fraser River. Historically, the J pod also occurred intermittently during this time in Puget Sound; however, records from The Whale Museum from 1997 through 2007 indicate that J pod did not enter Puget Sound south of the Strait of Juan de Fuca from approximately June through August.

Fall/Winter Distribution

During the fall, all three pods occur in areas where migrating salmon are concentrated, such as the mouth of the Fraser River. They may also enter areas in Puget Sound where migrating chum and Chinook salmon are concentrated (Osborne 1999). In the winter months, the K and L pods spend progressively less time in inland marine waters and depart for coastal waters in January or February. The J pod is likely to appear year-round near the San Juan Islands, and in the fall/winter, in the lower Puget Sound and in Georgia Strait at the mouth of the Fraser River.

Over the last several years, K and L pods have arrived earlier to the area in the spring and departed the area in the fall (Osborne et al. 2001). The Whale Museum keeps a database of verified sightings by location quadrants. Sightings may be of individual or multiple whales.

5.11.2.9 Gray Whale

Gray whales are baleen whales. The North Pacific gray whale stock is divided into two distinct geographically isolated stocks: eastern and western “Korean” (Angliss and Outlaw 2005). Individuals in this region are part of the Eastern North Pacific stock. The majority of the Eastern North Pacific population spends summers feeding in the Bering and Chukchi seas, but some individuals have been reported in waters off the coast of British Columbia, southern Alaska, Washington, Oregon, and California. Gray whales migrate in the fall, south along the coast of North America to Baja California, Mexico to calve. Gray whales occur in Washington waters during feeding migrations between late spring and autumn with occasional sightings during the winter months (Calambokidis et al. 2002).

It is believed that commercial hunting for gray whales reduced population numbers to below 2,000 individuals. After listing of the species under the ESA in 1970, the number of gray whales increased significantly, resulting in their delisting in 1994. Surveys since the delisting estimate that the population fluctuates at or just below the carrying capacity of the species (~26,000 individuals) (Angliss and Outlaw 2005). Population estimates from 1990 to 1998 range between 18,178 and 26,635 individuals and from 2000 through 2002, range between 18,000 to 19,000 individuals. Abundance data since 2000 suggests that the number of gray whales dropped after

1998, but has stabilized in recent years (Rugh et al. 2008). Abundance for 2006 was estimated at just over 20,000 individuals.

Gray whale sightings reported to Cascadia Research and the Whale Museum between 1990 and 1993 totaled over 1,100 (Calambokidis et al. 1994). Forty-eight individual gray whales were observed in Puget Sound and Hood Canal in 2004 and 2005 (Calambokidis 2007). Abundance estimates calculated for the small regional area between Oregon and southern Vancouver Island, including the San Juan area and Puget Sound, suggest there were 137 to 153 individual gray whales from 2001 through 2003.

Gray whales migrate within five to fifteen miles of the coast of Washington during their annual north/south migrations. Gray whales migrate south to Baja California where they calve in November and December, and then migrate north to Alaska from March through May to summer and feed. A few gray whales are observed in Washington inland waters between the months of January and September, with peak numbers of individuals from March through May (Calambokidis 2007). The average duration within Washington inland waters is 47 days and the longest stay was 112 days.

Although typically seen during their annual migrations on the outer coast, a regular group of gray whales annually comes into the inland waters at Saratoga Passage and Port Susan from March through May to feed on ghost shrimp (Weitkamp et al. 1992). During this time frame they are also seen in the Strait of Juan de Fuca, the San Juan Islands and areas of Puget Sound, although the observations in Puget Sound are highly variable between years (Calambokidis, et al. 2002). In 2007 and 2008 numerous sightings of gray whale(s) were reported in Puget Sound near Bremerton, Point Defiance, Whidbey Island, Mukilteo, Saratoga Passage, Mabana, Mariner's Cove, Skagit Bay, Penn Cove, Race Lagoon, and the Port Washington Narrows. There were also several reported sightings in the San Juan Islands during both years around the north end of Orcas Island and in Rosario Strait (Whale Museum 2008a).

5.11.2.10 Humpback Whale

Humpback whales are wide-ranging baleen whales that can be found almost worldwide. They summer in temperate and polar waters, and winter in tropical waters for mating and calving. Humpbacks are vulnerable to whaling due to their tendency to feed in near shore areas. Few humpback whales have been seen in Puget Sound, but more frequent sightings occur in the Strait of Juan de Fuca and near the San Juan Islands. Most sightings are in spring and summer. Humpback whales feed on krill, small shrimp-like crustaceans, and various kinds of small fish.

Whaling statistics estimate that before 1905, the population in the North Pacific was approximately 15,000 (Rice 1978). By 1966 the population dropped to 1,200 to 1,400 due to over hunting (Johnson and Wolman 1984). In the 1990s, the abundance of North Pacific humpback whales was estimated at 6,000 (Calambokidis et al. 1997). Current estimates indicated that the total abundance is just over 18,000 individuals (Calambokidis et al. 2008). The majority of the population winters in Hawaiian waters and feeds in the Bering Sea and Aleutians. The abundance estimate for Washington and Southern British Columbia is less than 500. Surveys in Washington waters between 1995 and 2000 estimated around 100 individuals.

Humpback whales were historically common in inland waters of Puget Sound and the San Juan Islands (Calambokidis 2002). In the early part of this century, there was a productive commercial

hunt for humpbacks in Georgia Strait that was probably responsible for their disappearance from local waters (Osborne et al. 1988). Individual humpback whales are rarely seen south of Admiralty Inlet. Approximately six individuals were seen between 1996 and 2001 (Calambokidis et al. 2002). Between January 2005 and August 2008, there were 34 total observations of humpback whales in Puget Sound south of Admiralty Inlet. The majority of these sightings were two individuals observed for several days in May, June, and July 2008, between Seattle and the southern tip of Puget Sound (Orca Network 2008). The Orca Network has not recorded sightings of humpback whales in Puget Sound during winter months in the last three years.

Sightings in inland Washington waters occurred more often in the Strait of Juan de Fuca and the San Juan Islands, than in Puget Sound (Orca Network 2008). From 2005 through 2008, humpbacks were observed one to five days a month in the Strait of Juan de Fuca in May through December of each year. In the San Juan Island area, humpbacks were observed three days in June 2005, one day in July 2005, one day in June 2007, and two days each in February and June 2008. Recent sighting information indicates that humpbacks are occurring more frequently in Puget Sound and the San Juan Islands than in previous years, but still occur in low numbers. Within Puget Sound, humpback whales could be present between April and July.

5.11.2.11 Minke Whale

World-wide, minke whales are one of the most abundant whales (Calambokidis and Baird 1994). The Northern minke whale is separated into two distinct subspecies: the Northern Pacific and the Northern Atlantic subspecies. Within the Northern Pacific subspecies, there are three stocks of minke whale recognized: the Sea of Japan/East China Sea, the western Pacific, and the “remainder” of the Pacific. Within US waters, the Northern Pacific stock is broken into three management stocks: the Alaskan stock, California/Oregon/Washington stock and the Hawaiian stock (NMFS 2008b). The California/Oregon/Washington management stock is considered a resident stock, which is unlike the other Northern Pacific stocks. This stock includes minke whales within the inland Washington waters of Puget Sound and the San Juan Islands.

Minke whales have small dark sleek bodies and a small dorsal fin. They feed by side lunging into schools of prey and gulping in large amounts of water. Food sources consist of krill, copepods, and small schooling fish, such as anchovies, herring, mackerel, and sand lance (NMFS 2008b).

Information on minke whale population and abundance is limited due to difficulty in detection. The total population size for the entire North Pacific is unknown (Carretta et al. 2007b). The number of minke whales in the California, Oregon and Washington stock is estimated between 500 and 1,015 individuals (NMFS 2008b). Over a ten-year period, 30 individuals were photographically identified around the San Juan Islands and demonstrated high site fidelity (Calambokidis and Baird 1994).

Minke whales are reported in Washington’s inland waters year-round, although the majority of the records are from March through November (Calambokidis and Baird 1994). Minke whales are relatively common in the San Juan Islands and Strait of Juan de Fuca, but relatively rare in Puget Sound. Most incidental observations in the San Juan Island Region have occurred in July and August (Orca Network 2008). Few observations occur in Puget Sound south of Admiralty Inlet. Between January 2005 and August 2008, fewer than 30 observations of minke whales were recorded with Orca Network from Admiralty Inlet to the southern tip of Puget Sound. All of

these observations occurred from March through November. The majority of these sightings (25) occurred in Admiralty Inlet or in Saratoga Passage. Very few (<5) observations of minke whales occurred south of Seattle between 2005 and 2008. Minke whales are also occasionally caught in salmon drift gillnet fishery in Puget Sound.

5.12 SPECIES OF SIGNIFICANT IMPORTANCE

5.12.1 Species Addressed

Species of significant importance are those listed or managed by either the federal government or state of Washington. This includes species listed as threatened, endangered, or species of concern under the ESA or MMPA. Species regulated by the state are those identified by the WDFW as priority species. Species of Concern in Washington include all State Endangered, Threatened, Sensitive, and Candidate species. Species of Concern also include Federal Endangered, Threatened, and Candidate Fish stocks. Species of Concern are also considered priority species. State Monitor species are not considered Species of Concern, but are monitored for status and distribution. They are managed, as needed, to prevent them from becoming endangered, threatened, or sensitive.

Table 12 lists species that have been documented in the project vicinity that have a federal or state status. The project vicinity is defined as being within several miles of the project site. This is synonymous with the definition of “action area” utilized within ESA-related documents. The extent of the project vicinity factors in that these species are mobile and can traverse across large swaths of the landscape.

Table 12: Species of Significant Importance

#	Common Name	Federal ESA Status	Federal MMPA Status	State Status
1.	Chinook Salmon	Threatened	Not Applicable	State Candidate
2.	Coho Salmon	Species of Concern	Not Applicable	State Candidate
3.	Chum Salmon	Not Warranted	Not Applicable	State Candidate
4.	Sockeye Salmon	Not Warranted	Not Applicable	State Candidate
5.	Pink Salmon	Not Warranted	Not Applicable	Not Warranted
6.	Steelhead Trout	Threatened	Not Applicable	Candidate
7.	Sea-run Cutthroat Trout	Species of Concern (coastal subspecies)	Not Applicable	Not Warranted
8.	Bull Trout	Threatened	Not Applicable	State Candidate
9.	Sand Lance	Not Warranted	Not Applicable	Priority Species – Breeding Areas
10.	Surf Smelt	Not Warranted	Not Applicable	Priority Species – Breeding Areas
11.	Herring	Not Warranted, previously petitioned for possible listing.	Not Applicable	State Candidate
12.	Harbor Seal	Not Warranted	Not Depleted	State Monitor
13.	California Sea Lion	Not Warranted	Not Depleted	Not Warranted
14.	Stellar Sea Lion	Threatened	Depleted	State Threatened
15.	Northern Elephant Seal	Not Warranted	Not Depleted	Not Warranted
16.	Harbor Porpoise	Not Warranted	Not Depleted	State Candidate
17.	Dalls Porpoise	Not Warranted	Not Depleted	State Monitor

#	Common Name	Federal ESA Status	Federal MMPA Status	State Status
18.	Pacific White-sided dolphin	Not Warranted	Not Depleted	State Candidate
19.	Killer Whale	Endangered	Depleted	State Endangered
20.	Humpback Whale	Endangered	Depleted	State Endangered
21.	Gray Whale	Not Warranted	Not classified	State Sensitive
22.	Minke Whale	Not Warranted	Not Depleted	State Monitor
23.	Vaux's Swift	Not Warranted	Not Applicable	State Candidate
24.	Purple Martin	Not Warranted	Not Applicable	State Candidate
25.	Western Grebe	Not Warranted	Not Applicable	State Candidate
26.	Caspian Tern	Not Warranted	Not Applicable	State Monitor
27.	Pileated Woodpecker	Not Warranted	Not Applicable	State Candidate
28.	Bald Eagle	Species of Concern	Not Applicable	State Sensitive
29.	Marbled Murrelet	Threatened	Not Applicable	State Threatened
30.	Olive-sided Flycatcher	Species of Concern	Not Applicable	Not Warranted
31.	Great Blue Heron	Not Warranted	Not Applicable	State Monitor
32.	Horned Grebe	Not Warranted	Not Applicable	State Monitor
33.	Common Loon	Not Warranted	Not Applicable	State Sensitive

5.13 FEDERALLY LISTED SPECIES

The USFWS species list for Snohomish County (checked January 6, 2010 and last revised November 1, 2007) includes six species listed as threatened or endangered, designated critical habitat for three species, no proposed species, two candidate species, and 15 species of concern. There are also several ESA-listed marine mammals and turtles that occur off the Washington Coast and in Puget Sound. Based on a review of existing habitat conditions and the WDFW PHS data, no federally listed species under the jurisdiction of the USFWS occur on the project site; however, several listed species are present in the marine waters that define the western edge of the Paramount Petroleum facility. Species under jurisdiction of the USFWS that could occur within the “action area” include bull trout (*Salvelinus confluentus*) and its designated critical habitat and marbled murrelet (*Brachyramphus marmoratus*).

The NMFS has jurisdiction over federally listed anadromous salmonids, marine mammals and turtles, designated Chinook salmon critical habitat, and essential fish habitat (EFH). None of these species exist on-site, but do seasonally occur in the adjacent marine waters. Listed species under jurisdiction of the NMFS present in the adjacent marine waters include Puget Sound Chinook salmon (*Oncorhynchus tshawytscha*), Puget Sound steelhead trout (*O. mykiss*), southern resident killer whale (*Orcinus orca*) and its designated critical habitat, humpback whale (*Megaptera novaeangliae*), and Steller sea lion (*Eumetopias jubatus*).

5.13.1 Matrix of Pathways and Indicators

Existing marine conditions were generally quantified by using watershed and habitat parameters as defined by the “Matrix of Pathways and Indicators” developed by NMFS (**Table 13**). However, NMFS has not published a matrix that addresses marine-related pathways and indicators. The following matrix was modified from the Matrix of Pathways and Indicators. Modifications include adding pathways and indicators applicable to the marine environment.

Table 13: Marine Nearshore Matrix of Pathways and Indicators Summary

	INDICATORS	BASELINE CONDITIONS	COMMENTS
Water Quality	Temperature	Properly Functioning	With the exception of Shilshole Bay near the Lake Washington Ship Canal, the available data does not indicate that overall temperature in marine waters is degraded due to anthropogenic factors. Temperature is highly variable.
	Turbidity	Properly Functioning	The available data does not indicate that turbidity levels in Puget Sound have increased or are impacting listed species.
	Chemical Contamination & Nutrients	At Risk	Several sites in Puget Sound are highly contaminated, but they tend to be isolated and near major ports, industrialized areas, and sewage outfalls.
	Fecal coliform	At Risk	Higher levels occur at beach sites than offshore sites. Areas near freshwater inputs typically experience higher colony counts. Some beach stations fail state standards on a consistent basis.
	Dissolved Oxygen (DO)	Properly Functioning	Unlike Hood Canal, Puget Sound has not experienced catastrophic low DO levels. This is likely due to the higher rate of flushing or circulation. Low DO levels have been reported in Puget Sound, but this is typically attributed to inputs of low-oxygenated Pacific water and consumption of oxygen by bacterial respiration (King County 2009).
Sediment	Sediment Quality	At Risk	A wide array of contaminants have been reported from sediment samples collected in Puget Sound. Although some areas are highly contaminated, the levels at most sites are below state standards.
Habitat Elements	Depth	At Risk	Impacted by seawalls, railroad, and other structures that have reduced the amount of shallow water habitat.
	Substrate	At Risk	Impacted by seawalls and railroad fill that increase scour thereby reducing the amount of fines. The "at risk" condition is specific to nearshore areas impacted by development.
	Slope	At Risk	Impacted by seawalls and railroad fill that increase scour thereby reducing the amount of fines. The "at risk" condition is specific to nearshore areas impacted by development.
	Shoreline Modification	Not Properly Functioning	The shoreline along King and Snohomish County between Tacoma and Everett has been highly developed and modified.
	Shoreline Vegetation	Not Properly Functioning	The amount of native vegetation along the shoreline has been significantly reduced and altered.
	LWD	At Risk	The amount of LWD that gets deposited along the shoreline of Puget Sound has been reduced due to numerous factors. Primary factors include logging and shoreline development.
	Overwater Structures	At Risk	Docks and piers are locally present, sporadically abundant, but also absent along large sections of shoreline. However, railroad fill has covered the uppermost section of shoreline along a significant portion of western Puget Sound.
	Aquatic Vegetation	At Risk	Trend data for kelp and eelgrass is variable, but evidence of a decline in eelgrass has been documented at numerous sites.
Biota	Epibenthic and Pelagic Zooplankton	Properly Functioning	No data and no significant indication of a decline.
	Benthic Infauna	Properly Functioning	No data and no significant indication of a decline.
	Forage Fish	At Risk	Declines in abundance have been documented.
Watershed Conditions	Road and Railway Density and Location	Not Properly Functioning	Most shoreline areas impacted by either road or railroad infrastructure at or near shoreline.
	Disturbance History	At Risk	At risk due to seasonally and localized daily boat traffic, which includes freighters, ferries, commercial and recreational fishing, and pleasure boats.

5.14 KING COUNTY BRIGHTWATER OUTFALL

The southernmost portion of Point Wells is currently in use by King County for construction of the Brightwater outfall. Refer to **Figure 5** for an overview of the general location of the Brightwater project site. This site is also referred to as the Point Wells Portal. King County condemned and took control (through a temporary construction easement) of approximately 12 acres in August 2006. King County has also taken over control of the southern end of the Point Wells dock through a temporary barge and dock easement. In addition, King County acquired an approximate one acre parcel (the “Fee Parcel”) at the southernmost portion of the property.

King County is constructing a new regional wastewater treatment facility in Woodinville, Washington. The treated wastewater from the plant in Woodinville will be conveyed by underground pipeline approximately 13 miles to Point Wells (Richmond Beach). The one acre parcel purchased by King County will be the site of a permanent access shaft (Portal 19) to the underground pipeline. The pipeline will continue from Portal 19, underneath the Richmond Beach seawall, and extend approximately one mile into Puget Sound where the treated wastewater will be discharged.

Construction activities began during 2007. A tunnel boring machine is being used to drill a 21,000 foot long tunnel and pipeline inland to connect up with another tunnel and pipeline at Portal 5 on Ballinger Way, Shoreline, Washington. At Point Wells, spoils from the boring operation are being moved by conveyor belt to the southern end of the dock where they are loaded onto barges for transport to an off-site disposal site. In 2008, installation of the marine outfall line was completed, which will eventually be connected to the tunnel pipeline. Construction is scheduled to be completed in 2011, assuming no significant delays. Permanent facilities will be underground and will include a transition structure, an effluent sampling station, and a dechlorination facility.

5.15 SITE CONTAMINATION AND REMEDIATION

This section presents a brief overview of contaminants present at the site, a description of what has been done at the site to address the contamination, current status of cleanup activities, and a summary of the current remediation approach as described by Hart Crowser.

Investigations to evaluate the extent of subsurface hydrocarbon contamination began in 1983. These investigations identified the presence of light hydrocarbon or separate-phase hydrocarbon (SPH) above the water table. Additional studies were conducted in 1985 and 1988 to further identify the extent of the free product plume and to develop a groundwater monitoring program. The SPH soil and groundwater monitoring program has been continued and frequently expanded since that time. The first SPH recovery wells were put into operation in the late 1980s, most of which are continuing in operation. Since the early 1990s, SPH recovery operations have been expanded along with the installation of a groundwater pumping and treatment system. Vapor recovery and extraction well (VREW) systems were installed in two areas that greatly accelerated the recovery of SPH, but have since ceased operation. A sheet pile wall was installed in conjunction with one of the VREW systems that successfully controlled the migration of SPH toward Puget Sound.

The SPH recovery and groundwater treatment system continues to operate at the site. Chevron and Paramount Petroleum submit quarterly discharge monitoring reports under the requirements of the National Pollution Discharge Elimination System (NPDES) permit issued for the groundwater treatment system discharge. As a requirement of that permit, an annual groundwater monitoring report is submitted to Ecology. The past and continuing site remediation actions are being conducted under Ecology's Voluntary Cleanup Program (VCP). The final site remediation planning and cleanup will continue as a VCP action in close coordination with Ecology.

Soil and groundwater contaminants are also present. These constituents include petroleum hydrocarbons (gas, diesel, and oil) and benzene, toluene, ethylbenzene and xylenes (BTEX), and are present at levels in soil and groundwater that exceed Model Toxics Control Act (MTCA) criteria for unrestricted land use. To implement the planned mixed use residential-commercial development of the property, the current remediation program will be expanded and accelerated. Based on currently available data, the remediation approach breaks the site down into two areas, the inland area and near shore area. In addition, the southern portion of the site will be occupied by King County for Brightwater tunnel and outfall construction through 2011, which will delay remediation in this area.

The inland area comprises approximately 75 percent of the area to be cleaned up. In most of this area, groundwater and soil data show constituent levels to be below unrestricted land use criteria and minimal areas of SPH have been found. However, because of the large degree of uncertainty (due to the lack of comprehensive data) and the presence of many above-ground tanks and pipeline corridors, it has been estimated that approximately 20 percent of the area will ultimately need to be remediated. The scattered areas of soil contamination are expected to be limited to the upper 5 feet (above the lowest groundwater table levels), and will be cleaned up by excavation and disposed of at an approved landfill, or treated off-site or on-site by thermal treatment. The soils treated off site may be returned to the site for use as backfill. The scattered area of contaminated groundwater will be cleaned up by in situ treatment methods (most likely using oxygen-releasing compounds in single injection treatments). These estimates will be verified through additional site sampling and a cleanup action plan will be prepared and submitted to Ecology for approval. Once site demolition has taken place, the remediation of the inland area can be accomplished in phases and can be completed relatively quickly (1 to 2 years per phase) so that construction and occupation can proceed.

The near shore area (the remaining 25 percent of the site) represents the areas of heaviest soil and groundwater contamination and is the location of almost all of the SPH. Therefore, remediation of the soils and SPH will require more extensive excavation and recovery efforts. Because groundwater depths are greater in this area (up to 12 feet), excavation will extend to an average of 8 feet in depth, and groundwater extraction and SPH skimming will be conducted within the excavation to remove any sources of continuing contaminant releases to groundwater. The contaminated soils may again be thermally treated off-site or on-site, and then potentially returned to the site for backfill. With the source areas removed, it is anticipated that natural attenuation will allow the groundwater to reach unrestricted land use cleanup criteria, and that this process will take 10 or more years to complete. During this time, land use restrictions will be put in place; however, they will be compatible with the planned commercial and public use of this area. It is anticipated that the near shore area can be cleaned up in phases; and though immediate accommodations can be made for the planned shoreline public promenade, cleanup

timeframes sufficient to allow construction and occupation to occur could extend for up to 3 to 5 years.

There is currently no evidence that contaminants from the onshore property are continuing to impact the beach and offshore sediments. Though there are likely areas of contamination associated with past petroleum loading and unloading operations, the cleanup of these areas will be addressed by the previous site owner. Any required cleanup will have to be done in conjunction with, but separately from, Paramount Petroleum's remediation of the onshore property.

Because unrestricted land use cleanup criteria for groundwater will likely not be met for the site as a whole for 10 to 15 years after cleanup begins, Paramount Petroleum will maintain deed restrictions and retain liability for cleanup requirements during this period. Once the criteria are achieved, a request for No Further Action (NFA) status will be submitted for Ecology review and approval. Once that approval is achieved, the deed restrictions and liability assurances will be rescinded and the site property will have full unrestricted land use status.

6.0 PROJECT IMPACTS

Project-related impacts to fish, wildlife, and/or habitat could occur during either construction or operation of the proposed project. Impacts can occur to specific species (e.g., juvenile Chinook salmon, bald eagle, etc.), specific habitat types (e.g., eelgrass beds, wetlands, etc.), or can be general impacts that affect all species and/or habitats within a geographic area (e.g., water quality, noise [terrestrial or aquatic], clearing vegetation, etc.). Impacts can also be separated into direct, indirect, and cumulative effects.

Impacts associated with the construction and operation of the proposed project will be addressed on multiple scales. First, impacts of the proposed project on various specific habitat types will be addressed. Potential impacts from both construction and operation are identified based on the available data. Since site plans are generally conceptual, assumptions will be stated and worst-case scenarios will be utilized. Impact minimization measures were previously outlined in **Section 3.0**, which are designed to reduce potential project-related impacts to fish, wildlife, and their habitats. Adherence to all impact minimization measures is assumed and factored into both species-specific and habitat-related impacts. Species-specific impacts are then addressed based on the identified impacts and impact minimization measures. The species addressed are those that are listed or managed by the state or federal government that could potentially occur in the action area, which was previously reported in **Section 5.0**.

6.1 HABITAT IMPACTS

Habitat types in the project area that could potentially be impacted by project-related activities are outlined in **Table 14**.

Table 14: Habitat Types

#	Habitat Type	Habitat Type Description
1.	Shoreline	Marine riparian zone along the shoreline above/upland of OHWM.
2.	Intertidal	From OHWM to extreme lower low water (ELLW). Within Puget Sound this region or area is also referred to as estuary or estuarine wetlands.
3.	Subtidal	From ELLW to – 30 meters.
4.	Eelgrass Beds	Documented in project area immediately south of large dock (Figure 7).
5.	Macro Algae	Scattered throughout intertidal and subtidal marine environment.
6.	Forage Fish Spawning Beaches	Documented spawning beaches or shorelines with suitable habitat (Figure 7).
7.	Freshwater Wetlands and vegetated buffers	Freshwater wetlands.
8.	Streams and vegetated buffers	Within upper forested bluff and piped through/under project area.
9.	Upland Forest	Within upper bluff.

6.1.1 Construction Effects

Construction-related impacts to natural habitats could result from the proposed project, but will generally be limited to habitats along the periphery of the project site since the project area is currently developed. Minor temporary and permanent impacts to forest and stream habitat will occur in the proposed upper Urban Plaza located on the east side of the BNSF tracks. Approximately 40 linear feet of impact to Chevron Creek will occur as the existing sediment trap at the base of forested slope needs to be moved upstream to accommodate site development. Upland forest impacts at the upper Urban Plaza is limited to clearing less than 0.25 acre near the base of the bluff. This area is dominated by red alder trees, maple trees, salmonberry, sword fern, and Himalayan blackberry.

Marine habitats may experience temporary disturbance in the form of localized sedimentation during shoreline restoration activities, pile driving, pile removal, outfall removal, ditch/wetland relocation, and channel daylighting activities. Furthermore, the current project plans include installing a series of three beach groins. The potential impacts associated with the installation of three beach groins have not been factored into project impacts and may negate a portion of the beneficial effects outlined in **Section 7.0**. Studies to determine how the proposed groins would influence nearshore processes will be conducted as part of the project specific EIS. These studies will be used as the basis of documenting potential changes to the shoreline, project impacts, and if the installation of groins should be included in the final design. Coordination with the regulatory authorities will be required.

The removal and installation of piles can suspend sediment. The installation of new piles will also result in a loss of habitat; however, considering how few new steel piles are proposed and how many old creosote piles will be removed, there will be a net gain in habitat area and habitat quality. Sediment-related impacts are anticipated to be short-term and localized due, in part, to the implementation of the impact minimization measures outlined in **Section 3.0**. The exact number of piles to be installed, size, type, and location has not been defined at this time. Although numerous impact minimization measures will be employed, minor and localized

sedimentation could also occur when the newly restored upper beach area is first exposed to tidal forces and wave action.

There will be temporary impacts from modifications to the existing dock. It is anticipated that the existing structure will be largely left unchanged, except for removal of all three existing access ramps, and installation of a new ramp near the center of the dock. Removal of these access ramps will create temporary disturbance to intertidal and subtidal habitat where existing pilings are proposed to be removed. Removing these piles will most likely be accomplished by cutting each pile below the mud line or pulling out with a crane. A limited amount of lower intertidal and subtidal habitat will be affected by pile removal. In addition, intertidal and subtidal habitat will be permanently affected by installation of new steel piles to support the new access ramp to the dock. However, this impact will be off-set by the removal of existing creosote piles. To support recreational boating on the existing pier, it will be necessary to construct new boat slips (**Appendix A**). These boat slips are likely to be floating piers located on the northeast side of the existing pier. Each of these piers are likely to be anchored with a single new piling.

No construction-related impacts to eelgrass beds are anticipated due to their absence from the immediate project footprint, but this assumption will be verified by conducting additional project-specific surveys. Surveys conducted as part of the Brightwater project did identify an eelgrass bed to southeast of the project site (**Figure 7**), but this area appears to be outside the zone of potential impact from sedimentation associated with pile removal, pile driving, outfall removal, or shoreline restoration. Macro algae may be present along the edge of the existing large dock where a new ramp is proposed. Potential impacts to macro algae can be avoided or minimized by spanning the area of concern, using clear or see-through decking, minimizing deck width, and carefully planned use of barge equipment during construction. As noted in the impact minimization measures, a barge plan will be implemented, which should include eelgrass avoidance measures.

Robust remediation efforts will reduce or eliminate the potential of contaminated soils from leaching or flowing into Puget Sound during construction. The remediation plan will include monitoring and contingency actions, and will require review and approval by the regulatory authorities prior to implementation.

6.1.2 Operation Effects

Operation-related impacts to fish and wildlife habitats are primarily associated with stormwater runoff, light, noise, and use of the nearshore marine environment.

Stormwater runoff from the developed condition will be treated per Ecology's 2005 *Stormwater Management Manual for Western Washington* (SvR Design Company 2010). The project will utilize Low Impact Development (LID) strategies such as bioswales, pervious pavement, and dispersion to maximize infiltration. Contech stormwater filters will be used to treat stormwater that cannot be infiltrated prior to being conveyed to Puget Sound via formal conveyance system or sheet flow dispersion (SvR Design Company 2010). The efficiency of treatment is dependent upon quantity and type of stormfilters utilized, filtration media selected, and maintenance. It is assumed the approved filtration system will be designed to target a full range of pollutants associated with urban runoff, including total suspended solids, soluble heavy metals, oil and grease, and nutrients. According to the analysis conducted by SvR Design Company (2010), the

amount of runoff for the developed condition will be less than that of the existing conditions and should not cause significant adverse impact to Puget Sound. The proposed stormwater treatment system will be required to be reviewed and approved by both Snohomish County and Ecology as part of the permit approval process. Additional input may be provided by the WDFW, USFWS, and NMFS during project review.

Impacts to fish and wildlife from excessive lighting during operation are difficult to quantify or assess. However, light pollution can result in disorientation or disruption of normal behavior. Birds that migrate or hunt at night can be impacted, as can other migratory or nocturnal species. Lighting and shadows have been shown to affect salmon migration behavior. Consideration of potential impacts to fish and wildlife from excess light should be addressed as part of the overall design process. Measures to reduce excess light include shielding, timers and dimmers, use of long wavelength lighting, directing lights away from open water, and limiting wattage. The existence of vegetative buffers between areas of potentially excessive light and sensitive fish and wildlife habitats can further reduce impacts.

Impacts to fish and wildlife from excessive noise during operation are also difficult to quantify or assess. However, as with lighting, the project can be designed to reduce excessive noise impacts during operation through the design process and implementation of vegetative buffers.

Operational use of the nearshore marine environment also has the potential to impact fish and wildlife. However, areas such as the beach and buffers will be dual-use areas for both humans and fish and wildlife. Measures to reduce impacts can be incorporated into the design. Potential measures include, but are not limited to creation of established trails, strategic placement of trash receptacles, maintenance and operation plans, and educational outreach.

6.1.3 Beneficial Effects

See **Section 7.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix A** contains a copy of the plan.

6.1.4 Salmonid Habitat Effects Matrix

The following Salmonid Habitat Effects Matrix (**Table 15**) describes potential impacts to salmonid habitat resulting from both construction and operation of the proposed project. It considers all life stages and all salmonids, not just federally listed salmonids as would be the case in ESA documentation. The project effects to baseline conditions factor in the use of BMPs and restoration activities that would be implemented as part of the overall project. It is assumed that BMPs and restoration actions will be successful, and monitored as appropriate. The effects to baseline conditions can be maintain, degrade, or improve. These effects can also change over time and vary depending on if considering either the local or watershed scale.

Based on an analysis of project effects to baseline conditions, the project would result in the maintenance of all water quality and sediment related indicators. Improvements at the local scale are anticipated to several habitat indicators due to the amount and type of proposed restoration. The proposed restoration has the potential to provide a significant improvement to shoreline habitat due to the amount of existing fill material and length of shoreline to be restored. However, the level of disturbance will increase during construction and stay elevated above existing conditions once developed.

Table 15: Salmonid Habitat Project Effects Matrix

	INDICATORS	BASELINE CONDITIONS	PROJECT EFFECTS TO BASELINE
Water Quality	Temperature	Properly Functioning	Maintain. A minor improvement is anticipated since the amount of impervious surface will be reduced.
	Turbidity	Properly Functioning	Maintain. A minor degradation could occur during construction, but this would be temporary and localized.
	Chemical Contamination & Nutrients	At Risk	Improve. An improvement is anticipated since site reclamation will occur and the risk of a major fuel spill will no longer be a potential impact. Stormwater treatment must be to the <u>enhanced</u> level to realize an improved condition after construction.
	Fecal coliform	At Risk	Maintain. A minor degradation could occur due to an increase in pet activity within the action area.
	Dissolved Oxygen	Properly Functioning	Maintain. No change to this function is anticipated.
Sediment	Sediment Quality	At Risk	Maintain. Future impacts to sediment quality are anticipated to be reduced through site clean-up and <u>enhanced</u> treatment of stormwater runoff. Beach restoration actions should also improve local conditions.
Habitat Elements	Depth	At Risk	Improve. This indicator will improve due to implementation of the proposed restoration plan. The project will result in an increase in nearshore intertidal habitat. Groins not factored into project effects to baseline.
	Substrate	At Risk	Improve. This indicator will improve due to implementation of the proposed restoration plan. Groins not factored into project effects to baseline.
	Slope	At Risk	Improve. This indicator will improve due to implementation of the proposed restoration plan. Groins not factored into project effects to baseline.
	Shoreline Modification	Not Properly Functioning	Improve. This indicator will improve due to implementation of the proposed restoration plan. Groins not factored into project effects to baseline.
	Shoreline Vegetation	Not Properly Functioning	Improve. This indicator will improve due to implementation of the proposed restoration plan.
	LWD	At Risk	Improve. This indicator will improve due to implementation of the proposed restoration plan.
	Overwater Structures	At Risk	Improve. The project will result in a reduction of area associated with overwater structures.
	Aquatic Vegetation	At Risk	Improve. This indicator will improve due to implementation of the proposed restoration plan.
	Wetlands	At Risk	Maintain. A minor improvement is anticipated due to additional open channel habitat and consolidating flow to Puget Sound thereby providing the opportunity of a minor improvement in estuarine wetland habitat.
	Streams	At Risk	Improve. This indicator will improve due to implementation of the proposed restoration plan.
Biota	Epibenthic and Pelagic Zooplankton	Properly Functioning	Improve. This indicator will improve due to implementation of the proposed restoration plan. Groins not factored into project effects to baseline.
	Benthic Infauna	Properly Functioning	Improve. This indicator will improve due to implementation of the proposed restoration plan. Groins not factored into project effects to baseline.
	Forage Fish	At Risk	Improve. This indicator will improve due to implementation of the proposed restoration plan. Groins not factored into project effects to baseline.

	INDICATORS	BASELINE CONDITIONS	PROJECT EFFECTS TO BASELINE
Watershed Conditions	Road Density and Location	Not Properly Functioning	Maintain. No change to this indicator is anticipated.
	Disturbance History	Functioning at Risk	Degrade. Degradation will occur during construction but stabilize once the site is developed. The overall level of activity will potentially increase over existing conditions even after construction.

6.2 SPECIES IMPACTS

For purposes of this analysis, species have been grouped into salmonids, forage fish, resident marine fish, marine mammals, marine birds, upland birds, raptors, and marine invertebrates. Other species will be addressed as warranted, based on their potential presence in the action area and susceptibility of being impacted by project-related activities.

6.2.1 Salmonids

6.2.1.1 Construction Effects

No salmonids exist within the streams at Point Wells. The nearshore marine environment along Point Wells is utilized by multiple species of salmonids (King County 2004). Outmigrating juvenile/sub adult salmonids are more reliant on the nearshore marine environment than most returning adults and, therefore, have a higher probability of being impacted by project-related activities. Project-related impacts to salmonids that could occur during construction are primarily associated with pile driving and degradation of water quality.

The primary project-related direct impact to salmonids is associated with pile driving. Conducting pile driving when juvenile salmonids are not typically present can reduce potential impacts. The WDFW in-water work window, which previously was from August 1 through February 15, does not protect juveniles that are present in the project area later in the summer. The Corps in-water work window is more restrictive, typically extending from September 1 through February 15. Note that in-water work windows are subject to change, and factor in multiple species. The dates outlined above are from project area permits obtained during 2007 – 2008. Additional considerations such as potential presence of marine mammals, marbled murrelets, forage fish, and bald eagles are factored into the final in-water work window. The USFWS further reduced the work window for the Brightwater project from October 1 through February 15 to reduce potential impacts to molting marbled murrelets. **Table 16** outlines the probability of impacting specific salmonid life histories from pile driving from October 15 through February 15. Refer back to **Table 7** for a summary of salmonid timing. The probability column below assumes the impact minimization measures outlined in **Section 3.0** will be successfully implemented.

Based on the available data, pile driving has the highest probability of impacting individual adult coho and chum salmon, as well as adult winter-run steelhead and sea-run cutthroat trout. Adult sockeye will not be present within the action area during pile installation and would, therefore, not be impacted by construction-related activities. It is unlikely any adult pink salmon would be present as most, if not all, would have returned to their natal river system by October. Bull trout are typically most abundant in Puget Sound during the spring and early summer, but are also present during the fall and winter, especially in areas such as Skagit Bay where a relatively

healthy population exists. Most, but not all, juvenile salmonids will have left the nearshore environment of Puget Sound by October.

The current project plans include installing a series of three beach groins. The potential impacts associated with the construction of beach groins have not been factored into project impacts. Studies to determine how the proposed groins would influence nearshore processes will be conducted as part of the project specific EIS. These studies will be used as the basis of documenting potential changes to the shoreline and project impacts.

Table 16: Salmonid Pile Driving Impact Summary

Common Name	Probability of being in action area during pile driving	Comments
Adult Chinook Salmon	Low	Fall Chinook could be present at beginning of work window.
Juvenile Chinook Salmon	Low	Some juveniles could still be present at the beginning or even the very end of the approved in-water work window. However, this appears unlikely but if present abundance would be very low.
Adult Coho Salmon	Moderate	Returning coho could be present at the beginning of the work window.
Juvenile Coho Salmon	Zero	All juvenile coho salmon should be gone by October 1.
Adult Chum Salmon	Moderate	Returning chum could be present at the beginning of the work window.
Juvenile Chum Salmon	Zero	All juvenile chum salmon should be gone by October 1.
Adult Sockeye Salmon	Zero	No adult sockeye salmon should be present in the action area during the in-water work window.
Juvenile Sockeye Salmon	Zero	No juvenile sockeye salmon should be present in the action area during the in-water work window.
Adult Pink Salmon	Low	Primarily odd years. Most should be out of action area by October 1.
Juvenile Pink Salmon	Zero	Primarily even years. No juvenile pink salmon should be present in the action area during the in-water work window.
Adult Steelhead Trout	Moderate	Winter-run adult steelhead could be present.
Juvenile Steelhead Trout	Zero	No juvenile steelhead trout should be present in the action area during the in-water work window.
Adult Sea-run Cutthroat Trout	Moderate	Adult sea-run trout could be present in the action area during the in-water work window.
Juvenile Sea-run Cutthroat Trout	Low - Moderate	Uncertain but could be present.
Adult Bull Trout	Low	Could be present but probability appears low.
Sub-adult Bull Trout	Low	Could be present but probability appears low.

Construction-related impacts to salmonids associated with degraded water quality could occur if turbid or polluted runoff leaves the site untreated. This is unlikely since multiple erosion control measures will be installed and monitored during construction. The project will be required to implement and monitor an approved SWPPP that will include multiple BMPs as required by both Snohomish County and Ecology. The NPDES construction permit issued by Ecology requires inspection by a CESCL. The implementation of the impact minimization measures outlined in **Section 3.0** will further reduce the likelihood of project-related activities impacting salmonids during construction.

6.2.1.2 Operation Effects

Operational impacts to salmonids could occur if degraded stormwater runoff from the built project or on-site contaminants reach Puget Sound during operation. Refer to **Section 6.1.2** for

an overview on potential operational impacts related to stormwater runoff and **Section 5.15** for a summary of contaminate remediation measures. Lighting and shadows have also been shown to affect salmon migration behavior, which may result in an increased risk of mortality due to delays in migration, loss of schooling refugia, or avoidance behavior resulting in movement to deeper waters (Simenstad et al. 1999). It is unknown at this time how future lighting from the developed condition will compare with the existing condition, or what changes in lighting are proposed at the dock. However, dock lighting for the developed condition should be designed to reduce impacts to juvenile salmonids. A detailed discussion of lighting and salmonids can be found in *Impacts of Ferry Terminals on Juvenile Salmon Migrating Along Puget Sound Shorelines – Phase I: Synthesis of State of Knowledge* (Simenstad et al. 1999). Operational impacts could also occur due to the presence of groins. The potential impacts associated with the operation of beach groins have not been factored into project impacts. Studies to determine how the proposed groins would influence nearshore processes will be conducted as part of the project specific EIS. These studies will be used as the basis of documenting potential changes to the shoreline and potential operational impacts to salmonids.

Beneficial Effects

See **Section 7.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix A** contains a copy of the plan.

6.2.2 Forage Fish

As previously illustrated in **Figure 7**, forage fish have been documented spawning along portions of the shoreline at Point Wells. Therefore, project-related activities could potentially impact spawning forage fish or their habitats.

6.2.2.1 Construction Effects

Potential construction-related impacts are primarily associated with pile driving, groin construction, shoreline restoration, stormwater runoff, and exposure to existing contaminants. Although the impact minimization measures outlined in **Section 3.0** have been designed to reduce potential impacts to forage fish and forage fish spawning habitat in the project vicinity, the in-water work window of October 15 through February 15 coincides with when sand lance and surf smelt could potentially spawn in the project area (**Table 17**).

Table 17: Forage Fish

Common Name	Spawning	Comment
Sand Lance	November - February	High regional variability in spawning period. Adults nearshore spring through summer.
Surf Smelt	Year round.	
Herring	January - April	Juveniles may disperse to deeper waters in the fall.

Pile driving has the highest probability of impacting individual forage fish if present during construction. Pile driving after forage fish spawning could impact eggs or juveniles in the immediate project vicinity. Since the area of potential effect due to underwater noise from pile

driving includes documented spawning habitat, pile driving is considered the primary action of concern regarding direct impacts to forage fish.

The potential impacts associated with the construction of beach groins on forage fish have not been factored into project impacts. Studies to determine how the proposed groins would influence nearshore processes will be conducted as part of the project specific EIS. These studies will be used as the basis of documenting potential construction-related impacts to forage fish.

Specific impact minimization measures that could reduce construction effects to forage fish include measures that reduce underwater noise and limit the probability of forage fish being present during pile driving. Potential noise reduction measures include the use of a vibratory hammer versus an impact hammer, installing a wood block between the pile and impact hammer, and using a bubble current. These measures will not eliminate underwater noise, but will reduce the amount of noise and area of potential biological effect.

The impact minimization measures outlined in **Section 3.0** include monitoring for forage fish spawning starting one week prior to start of in-water pile driving and during pile driving. Pile driving is to stop should forage fish be observed spawning during pile driving. Pile driving may commence one week after forage fish stop spawning. Immediately contact the local area habitat biologist should forage fish be observed spawning during pile driving. Confer with the local area habitat biologist on appropriate measures to protect spawning forage fish. The remainder of the impact minimization measures are designed to reduce potential impacts to existing spawning habitat.

6.2.2.2 *Operation Effects*

Operational impacts include impacts primarily associated with stormwater runoff, contaminants, groins, and propeller wash impacting existing eelgrass beds. Stormwater-related operation effects previously described for salmonids in **Section 6.2.1.2** also apply to forage fish. The implementation and monitoring of an approved contamination remediation plan is assumed to adequately protect marine resources, including forage fish. The degradation of existing eelgrass beds within the project area from propeller wash may occur, especially if boats veer near the shoreline during low tide.

6.2.2.3 *Beneficial Effects*

See **Section 7.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix A** contains a copy of the plan.

6.2.3 Resident Marine Fish

As previously outlined in **Table 6**, numerous species of fish have been documented in the project vicinity. Many of the species outlined in **Table 6** are resident fish that will utilize the project area throughout the year. These species are susceptible to project-related impacts, but would also benefit from the proposed restoration plan.

6.2.3.1 *Construction Effects*

Impacts to resident marine fish from construction are similar to those outlined in **Section 6.2.1.1** and **6.2.2.1**. However, some localized mortality to resident marine fish is anticipated from pile

driving. This is most likely to occur to species such as pile perch and flatfish that could be in close proximity to where piles are to be installed. Impact minimization measures previously outlined in **Section 3.0** will reduce the level of effect associated with construction.

6.2.3.2 *Operation Effects*

Impacts to resident marine fish from operation are similar to those outlined in **Section 6.2.1.2** and **6.2.2.2**. However, since resident fish are present in the project area year-round, they are more susceptible to water quality-related impacts due to increased exposure to both dissolved and sediment bound contaminants.

6.2.3.3 *Beneficial Effects*

See **Section 7.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix A** contains a copy of the plan.

6.2.4 Marine Mammals

The use of the project vicinity by marine mammals was previously outlined in **Section 5.11.2**. Eleven species of marine mammals utilize Puget Sound or adjacent marine waters either year-round or seasonally and could, therefore, be present near the project area (**Table 11**). However, seasonal abundance is extremely variable and the only year-round resident is the harbor seal. Some marine mammals are common on a seasonal basis, while others are extremely rare. Several species of marine mammals are federally listed, and potential impacts to these species are addressed in **Section 6.3**.

6.2.4.1 *Construction Effects*

Construction effects to marine mammals is primarily associated with pile driving since the extent of potential biological effect from underwater noise may extend up to 0.54 mile from the project area (**Figure 5**). It is assumed in-water work will be allowed from approximately October 1 through February 15. This time period does not significantly reduce or exclude the potential for marine mammals from being in the general project vicinity during pile driving or in-water work. The impact minimization measures outlined in **Section 3.0** include multiple measures designed to reduce the potential of construction-related actions from impacting marine mammals. This includes measures to reduce impacts from water quality degradation and pile driving.

Although marine mammals could be impacted by construction-related activities, these impacts would be minor and short-term. Marine mammals are highly mobile and would likely avoid the immediate project area during pile driving. No haul-out or typical use areas are known to exist within the area of potential biological effect.

6.2.4.2 *Operation Effects*

Operation effects are generally similar to those outlined for salmonids and forage fish. Another factor is boat traffic, which could increase at the local scale, but is not anticipated to increase at the regional scale. Furthermore, this potential increase in pleasure craft traffic would be off-set by a reduction in tanker traffic. Collisions and oil spills from tankers is likely a much more significant impact to marine mammals than pleasure craft.

6.2.4.3 *Beneficial Effects*

See **Section 7.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix A** contains a copy of the plan.

6.2.5 Marine Birds

6.2.5.1 *Construction Effects*

Construction effects to marine birds are similar to those described for salmonids, forage fish, and marine mammals in that potential impacts are primarily associated with pile driving, in-water work, and water quality-related issues. The impact minimization measures outlined in **Section 3.0** would also reduce potential impacts to marine birds. Construction activities will temporarily impact marine birds that frequent the immediate project area. This impact will primarily impact cormorants and waterfowl that utilize the docks, piers, and nearshore marine environment. Construction-related activities will result in a temporary disturbance to roosting and foraging habitat.

6.2.5.2 *Operation Effects*

Operation effects are generally similar to those outlined for salmonids, forage fish, and marine mammals.

6.2.5.3 *Beneficial Effects*

See **Section 7.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix A** contains a copy of the plan.

6.2.6 Upland Birds

6.2.6.1 *Construction Effects*

Impacts to upland birds during construction will primarily be limited to those that nest or forage within the built environment, since natural upland habitats are generally lacking within the proposed development footprint. Species that nest on buildings in the project area are primarily limited to barn swallows, house sparrows, pigeons, and European starling. Construction-related impacts to upland birds will be temporary and primarily associated with disturbance of uplands birds in adjoining habitats. Some species will be temporarily displaced from the project area during construction.

6.2.6.2 *Operation Effects*

Operational effects on upland birds are anticipated to be similar to those described in **Section 6.1.2**. Although there is the possibility of collision into the newly constructed building and associated infrastructure, this is likely to be an infrequent occurrence.

6.2.6.3 *Beneficial Effects*

See **Section 7.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix A** contains a copy of the plan.

6.2.7 Raptors

The three most common raptors in the immediate project vicinity are the red tailed hawk and bald eagle. Both of these species regularly utilize the general project vicinity. As noted in **Section 5.1** and illustrated in **Figure 7**, three bald eagle nests are mapped as occurring in the vicinity of Point Wells. The closest nest is approximately 0.5 mile northeast of the project site. The shoreline to the west of these nests and north of the project site is mapped as shoreline buffer. The shoreline buffer area extends onto the northernmost portion of the project site. No red tailed nests have been documented in the project vicinity, but suitable nesting habitat is present within the forested bluff to the east of the project site.

6.2.7.1 Construction Effects

No impact to nesting bald eagles is anticipated from construction due to the extended distance between the project site and closest documented nest. These nests are not within line of sight and are buffered by trees and terrain. Temporary disturbance to foraging bald eagles and red tailed hawks could occur during construction, primarily during pile driving. Impacts to raptors during construction would be temporary and would be limited to loss of foraging or perching habitat through displacement. Bald eagles or red tailed hawks attempting to forage or perch in the immediate project vicinity would be temporarily displaced from the project area to more suitable habitats along the shoreline. Construction-related activities will not remove any potential perching or roosting habitat.

6.2.7.2 Operation Effects

Operational effects to bald eagles and red tailed hawks would be similar to those previously described in **Section 6.1.2**.

6.2.7.3 Beneficial Effects

See **Section 7.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix A** contains a copy of the plan.

6.2.8 Marine Invertebrates

Marine invertebrates are included since they are an important prey item for numerous species of fish and wildlife, including several federally listed species. They represent a diverse and locally abundant group of organisms.

6.2.8.1 Construction Effect

Construction effects to marine invertebrates are primarily associated with pile driving, removal of existing piles, installation of groins, and other in-water work. It is assumed water quality leaving the project site during construction will meet state standards, and impact minimization measures outlined in **Section 3.0** will be successfully implemented. Although marine invertebrates will be impacted during construction, these impacts will be temporary and short-term.

6.2.8.2 Operation Effects

Impacts to resident marine invertebrates from operation are similar to those outlined in **Section 6.2.1.2** and **6.2.2.2**. However, since marine invertebrates are present in the project area year-

round, they are more susceptible to water quality-related impacts due to increased exposure to both dissolved and sediment bound contaminants.

6.2.8.3 Beneficial Effects

See **Section 7.0** for a summary of the conceptual restoration plan and beneficial effects; **Appendix A** contains a copy of the plan.

6.3 FEDERALLY LISTED SPECIES

The following section describes the federal status, critical habitat, occurrence, potential impacts, and determination of effect for federally listed species documented in the action area. This is not an official biological assessment since project-related details are still being developed. This section provides background data on federally listed species that may occur in the action area and provides a preliminary determination based on the project-related information available to date. The following preliminary ESA determinations (**Table 18**) assume that all proposed impact minimization measures are successfully implemented.

Table 18: Preliminary ESA Determination Summary

Common Name	Determination
Chinook Salmon	May affect, not likely to adversely affect
Chinook Salmon Critical Habitat	May affect, not likely to adversely affect
Steelhead Trout	May affect, not likely to adversely affect
Steelhead Trout Critical Habitat	Not designated at present
Bull Trout	May affect, not likely to adversely affect
Bull Trout Critical Habitat	May affect, not likely to adversely affect
Killer Whale	May affect, not likely to adversely affect
Killer Whale Critical Habitat	No Effect
Humpback Whale	May affect, not likely to adversely affect
Marbled Murrelet	May affect, not likely to adversely affect
Marbled Murrelet Critical Habitat	No Effect
Essential Fish Habitat	No Adverse Effect

6.3.1 Chinook Salmon

Federal Status

The Puget Sound Chinook salmon is listed as a threatened species in Washington under the ESA. The NMFS is the lead regulatory agency for this listing under the ESA.

Critical Habitat

Critical habitat for this Evolutionary Significant Unit (ESU) was designated on September 2, 2005 (70 FR 52629). The project area is within the boundary of Puget Sound hydrologic unit number 17110019. Within areas designated as critical habitat, the Primary Constituent Elements (PCEs) essential for the conservation of this ESU are those sites and habitat components that support one or more life stages. The PCEs are further described as:

- (1) Freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development;*
- (2) Freshwater rearing sites with:*
 - (i) Water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility;*
 - (ii) Water quality and forage supporting juvenile development; and*
 - (iii) Natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.*
- (3) Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival;*
- (4) Estuarine areas free of obstruction and excessive predation with:*
 - (i) Water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater;*
 - (ii) Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels; and*
 - (iii) Juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation.*
- (5) Nearshore marine areas free of obstruction and excessive predation with:*
 - (i) Water quality and quantity conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation; and*
 - (ii) Natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels.*
- (6) Offshore marine areas with water quality conditions and forage, including aquatic invertebrates and fishes, supporting growth and maturation.*

Occurrence

Chinook salmon utilize the nearshore marine environment along Point Wells as foraging habitat and during migration. Juveniles are typically present in the action area from May through September (peaking in June), while adults are present from July through October (peaking in late August). Peak abundance through the Hiram M. Chittenden Locks at Lake Washington occurs in mid to late August and is generally complete by early November (Kerwin 2001). Chinook salmon typically spawn from mid-May through October, peaking in October within North Lake

Washington tributaries. Outmigration of juveniles (subyearlings and yearlings) to Puget Sound is variable but generally occurs between February and June. The fact that the project site is located along central Puget Sound means stocks from multiple watersheds move through the action area. This would include stocks from the Lake Washington watershed, Duwamish/Green River, Puyallup River, Nisqually River, and numerous independent drainages and hatcheries located to the south of Point Wells.

Impacts

Impacts described in **Section 6.1** and **Section 6.2.1** are applicable to Chinook salmon. Potential impacts based on the NMFS and USFWS matrix of pathways and indicators are summarized in **Table 15**. Based on this assessment of project effects to baseline conditions, the project would result in the maintenance of all water quality and sediment-related indicators. Improvements at the local scale are anticipated to several habitat indicators due to the amount and type of proposed restoration. The proposed restoration has the potential to provide a significant improvement to shoreline habitat due to the amount of existing fill material to be removed and length of shoreline to be restored.

The potential impacts associated with beach groins have not been factored into project impacts. Studies to determine how the proposed groins would influence nearshore processes will be conducted as part of the project specific EIS. These studies will be used as the basis of documenting potential changes to the shoreline and potential impacts to Chinook salmon and potential prey species such as forage fish.

The primary impact is associated with pile driving, which is anticipated to create an area of potential biological effect extending up to 0.54 mile from the project area (**Figure 6**). This is the area where impacts to Chinook salmon could occur if they are present during pile driving. Since in-water work is likely to be approved from October 15 through February 15, returning adult or outmigrating juveniles have a low probability of being in the action area during pile driving, but would be present during other construction-related activities.

Preliminary Determination

The proposed project *may affect, but is not likely to adversely affect* Chinook salmon. The project *may affect* Chinook salmon because:

- Chinook salmon have been documented in the action area.
- In-water work is proposed that includes pile driving.
- In-water work includes removing over 360 creosote piles.
- Over-water work includes removing existing structures.
- The project site includes approximately 3,600 linear feet of shoreline.
- The project includes remediation of contaminated soils and groundwater.
- Installation of groins is proposed.

The project *is not likely to adversely affect* Chinook salmon because:

- The in-water work window is likely to be from October 15 – February 15, which should avoid impacting most juvenile and adult Chinook salmon.
- Implementation of impact minimization measures should eliminate water quality impacts during both construction and operation of the proposed project.

The proposed project *may affect, but is not likely to adversely affect* Chinook salmon critical habitat. The project *may affect* Chinook salmon critical habitat because:

- Designated critical habitat occurs in the action area.
- In-water work is proposed that includes installation of new piles.
- Installation of groins is proposed.
- In-water and near-shore construction activities could temporarily increase turbidity at the local scale.

The project is *not likely to adversely affect* Chinook salmon critical habitat because:

- The project will result in a net decrease in piles within the project area.
- The project will result in a net decrease in overwater structures.
- The project will result in a net increase in nearshore marine habitat.
- The project will provide water quality treatment to a level higher than existing conditions.
- The project will eliminate a potential significant source of pollution to Puget Sound.

6.3.2 Steelhead Trout

Federal Status

The Puget Sound steelhead trout is listed as a threatened species in Washington under the ESA. The NMFS is the lead regulatory agency for this listing under the ESA.

Critical Habitat

Critical habitat for this ESU is currently under review and, therefore, not yet designated.

Occurrence

Data on use of the action area by steelhead trout is very limited. Steelhead trout utilize the nearshore marine environment and occur within the action area, but seasonal distribution and abundance information is not available or based on very little site specific data. The action area would be utilized as a migratory pathway and foraging habitat for both adult and juvenile steelhead trout. Peak abundance of juvenile steelhead trout is reported to be from April through July, while the adult peak would likely be bimodal and coincide with returning summer or winter runs.

Impacts

Impacts described in **Section 6.1** and **Section 6.2.1** are applicable to steelhead trout. Potential impacts based on the NMFS and USFWS matrix of pathways and indicators are summarized in **Table 15**. Based on this assessment of project effects to baseline conditions, the project would result in the maintenance of all water quality and sediment-related indicators. Improvements at the local scale are anticipated to several habitat indicators due to the amount and type of proposed restoration. The proposed restoration has the potential to provide a significant improvement to nearshore inter-tidal habitat due to the amount of existing fill material to be removed and length of shoreline to be restored.

The action area is very large due to the extended distance underwater noise travels when using an impact hammer on steel piles. The primary impact is associated with pile driving, which is anticipated to create an area of potential biological effect extending up to 0.54 mile from the project area (**Figure 6**). This is the area where impacts to steelhead trout could occur if they are present during pile driving. Since in-water work is likely to be approved from October 15 through February 15, returning adult winter-run steelhead trout would likely be present in the action area during this time period.

Preliminary Determination

The proposed project *may affect, but is not likely to adversely affect* steelhead trout. The project *may affect* steelhead trout because:

- Steelhead trout utilize the action area.
- The action area includes marine habitat utilized by multiple runs from multiple watersheds.
- The in-water work window is likely to be from October 15 – February 15, which avoids outmigrating juveniles, but not returning winter-run adults.
- In-water work is proposed that includes pile driving and installation of groins.
- In-water work includes removing over 360 existing creosote piles.
- Over-water work includes removing existing structures.
- The project site includes approximately 3,600 linear feet of shoreline.
- The project includes remediation of contaminated soils and groundwater.

The project *is not likely to adversely affect* steelhead trout because:

- The in-water work window is likely to be from October 15 – February 15, which should avoid impacting most juvenile steelhead trout.
- Impacts are likely to be temporary and of short duration.
- Implementation of impact minimization measures should eliminate water quality impacts during both construction and operation of the proposed project.

6.3.3 Bull Trout

Federal Status

Bull trout are listed as a threatened species in Washington under the ESA. The USFWS is the lead regulatory agency for this listing under the ESA.

Critical Habitat

Critical habitat was designated on October 26, 2005 (50 CFR Part 17), and then revised per a proposed rule on January 14, 2010. The project area is within the boundary of the Unit 2: Puget Sound, Sub-unit: Puget Sound Marine, which includes the nearshore marine environment along Point Wells. PCEs of critical habitat are the known physical and biological features that are essential to the conservation of the species. The PCEs for bull trout are as follows:

- permanent water having low levels of contaminants, such that normal reproduction, growth, and survival are not inhibited;
- water temperatures ranging from 36 to 59 degrees Fahrenheit with adequate refugia available for temperatures at the upper end of the range;
- complex stream habitat (LWD, side channels, pools, undercut banks);
- substrate of sufficient size, amount, and composition, to ensure egg, fry, young of the year, and juvenile survival;
- natural hydrograph with peak, high, low, and base flows within historic range;
- springs, seeps, groundwater sources, and subsurface water connectivity;
- migration corridors with minimum barriers between necessary habitats;
- abundant food base;
- few or no predatory, interbreeding, or competitive non-native species.

Occurrence

Bull trout utilize the nearshore environment as a migration corridor, adult and sub-adult foraging, and refugia. Peak abundance in the action area is likely to coincide with peak abundance of juvenile salmonids and/or forage fish. However, since few individuals have been captured, very little site specific data for the action area is available. Anadromous adults migrate downstream after spawning and enter estuarine waters in the spring. Anadromous adults return to their natal streams to spawn in late summer. As previously mentioned, bull trout are typically most abundant in Puget Sound during the spring and early summer, but are also present during the fall and winter, especially in areas such as Skagit Bay where a relatively healthy population exists. They also tend to be most active and abundant in nearshore environments during dawn and sunset.

Impacts

Impacts described in **Section 6.1** and **Section 6.2.1** are applicable to bull trout. Potential impacts based on the NMFS and USFWS matrix of pathways and indicators are summarized in **Table 15**.

Based on this assessment of project effects to baseline conditions, the project would result in the maintenance of all water quality and sediment-related indicators. Improvements at the local scale are anticipated to several habitat indicators due to the amount and type of proposed restoration. The proposed restoration has the potential to provide a significant improvement to shoreline habitat due to the amount of existing fill material to be removed and length of shoreline to be restored.

The action area is very large due to the extended distance underwater noise travels when using an impact hammer on steel piles. The primary impact is associated with pile driving, which is anticipated to create an area of potential biological effect extending up to 0.54 mile from the project area (**Figure 6**). This is the area where impacts to bull trout could occur if they are present during pile driving. In-water work is likely to be approved from October 15 through February 15. The amount of available data is not sufficient enough to confirm with 100 percent certainty that no bull trout will be present in the action area when pile driving is proposed.

Preliminary Determination

The proposed project *may affect, but is not likely to adversely affect* bull trout. The project *may affect* bull trout because:

- Bull trout have been documented in the action area.
- In-water work is proposed that includes pile driving and installation of groins.
- In-water work includes removing over 360 creosote piles.
- Over-water work includes removing existing structures.
- The project site includes approximately 3,600 linear feet of shoreline.
- The project includes remediation of contaminated soils and groundwater.

The project *is not likely to adversely affect* bull trout because:

- The in-water work window is likely to be from October 15 – February 15, which would be the time-frame when fewest bull trout are likely to be in the action area.
- Impacts are likely to be temporary and of short-duration.
- Implementation of impact minimization measures should eliminate water quality impacts during both construction and operation of the proposed project.
- Potential prey species will not be adversely impacted.

The proposed project *may affect, but is not likely to adversely affect* bull trout critical habitat. The project *may affect* bull trout critical habitat because:

- Designated critical habitat occurs in the action area.
- In-water work is proposed that includes installation of new piles and groins, and removal of old piles.

- In-water and near-shore construction activities could temporarily increase turbidity at the local scale.

The project is *not likely to adversely affect* bull trout critical habitat because:

- The project will result in a net decrease in piles within the project area.
- The project will result in a net decrease in overwater structures in the project area.
- The project will result in a net increase in nearshore and riparian marine habitat.
- Implementation of impact minimization measures will reduce or eliminate potential water quality impacts.

6.3.4 Killer Whale

Federal Status

The Southern Resident Killer Whale (SRKW) is listed as endangered under the ESA. The NMFS is the lead regulatory agency for this listing under the ESA.

Critical Habitat

Critical habitat was designated on November 29, 2006 (50 CFR Part 226). The project area is within the boundary of the Area 2: Puget Sound. Areas less than 20 feet deep relative to extreme high water are not designated as critical habitat. Primary PCEs in Area 2 include water quality, prey, and passage.

Occurrence

SRKW use of Puget Sound has been documented in all seasons, but more frequently during the fall than summer. J pod typically expands into this area during the fall to feed on late returning chum salmon, especially during the months of October and November. Based on data from 1990 through 2003, no sightings of SRKW occurred in this area in July. From August through October, they have been sighted a total of 6 to 25 days, and from December through February, they have sighted from 1 to 5 days over the 13 year period (NMFS 2006).

Impacts

Potential impacts to individual SRKW could occur if they are in the action area during pile driving. Based on the data reviewed for this report, SRKW are anticipated to potentially be present in the action area (**Figure 6**) during pile driving. Impacts would be in the form of harassment or disturbance. Impacts could result in a loss of foraging opportunity within the action area during pile driving. However, pile driving will be temporary and presence of SRKW within the action area is likely to be brief or sporadic. Implementation of the impact minimization measures in **Section 3.0** will reduce the probability of potentially impacting SRKW should they be present in the action area during construction.

Preliminary Determination

The proposed project *may affect, but is not likely to affect* SRKW.

The proposed project *may affect* SRKW because:

- SRKW have been documented in the action area.
- In-water work is proposed that includes pile driving.
- The in-water work window is likely to be from October 15 – February 15, which includes the time periods when they could be in the action area.
- Impact minimization measures reduce, but do not eliminate under water noise.

The proposed project *is not likely to adversely affect* SRKW because:

- Impact minimization measures will be implemented.
- Temporary avoidance of the action area during pile driving is not anticipated to significantly alter foraging or behavioral activities of SRKW.
- Potential prey items will not be significantly impacted.
- Pile driving will be temporary and short-term.
- Use by SRKW of the action area during the proposed in-water work window is limited and sporadic.

The proposed project will have *no-effect* on critical habitat.

6.3.5 Steller Sea Lion

Federal Status

The Steller sea lion is listed as threatened under the ESA. The NMFS is the lead regulatory agency for this listing under the ESA.

Critical Habitat

Steller sea lions were listed as threatened under the ESA on November 26, 1990 (55 FR 49204). The western stock was listed as endangered under the ESA on May 4, 1997, and the eastern stock remained classified as threatened (62 FR 24345). In 2006, the NMFS Steller seal lion recovery team proposed removal of the eastern stock from listing under the ESA based on its annual rate of increase of approximately three percent since the mid-1970s. On August 27, 1993 the NMFS published a final rule designating critical habitat for the Steller sea lion (NMFS 1993). No critical habitat has been designated in Washington. Critical habitat is associated with breeding and haulout areas in Alaska, California, and Oregon. No critical habitat occurs in Puget Sound.

Occurrence

Steller sea lions appear to be most abundant in Puget Sound during the spring and fall, but they have also been observed in the winter months. Since they do not breed in Puget Sound, individuals present are likely adults that have dispersed from their breeding grounds. They have been documented in Puget Sound in Shilshole and Elliott bays. Stellar sea lions utilize the action

area during migration and may forage where suitable prey is present. There are no rookeries in Washington and no haul-out areas in Puget Sound.

Impacts

Potential impacts to Steller sea lions are similar to those described for the SRKW.

Preliminary Determination

The proposed project *may affect, but is not likely to affect* Steller sea lions.

The proposed project *may affect* Steller sea lions because:

- Steller sea lions have been documented in the action area.
- In-water work is proposed that includes pile driving.
- The in-water work window is likely to be from October 15 – February 15, which includes the time periods when they could be in the action area.
- Impact minimization measures reduce, but do not eliminate under water noise.

The proposed project *is not likely to adversely affect* the Steller sea lion because:

- Impact minimization measures will be implemented.
- Temporary avoidance of the action area during pile driving is not anticipated to alter foraging or behavioral activities of Steller sea lions.
- Potential prey items will not be significantly impacted.

The proposed project will have *no-effect* on critical habitat because it does not exist within the action area.

6.3.6 Humpback Whale

Federal Status

The humpback whale is listed as endangered under the ESA. The NMFS is the lead regulatory agency for this listing under the ESA.

Critical Habitat

Critical habitat has not been designated for this species.

Occurrence

Humpback whales are seasonally common along the Washington Coast, but rare in Puget Sound. Individual humpback whales are rarely seen south of Admiralty Inlet. Approximately six individuals were seen between 1996 and 2001 (Calambokidis et al. 2002). Between January 2005 and August 2008, there were 34 total observations of humpback whales in Puget Sound south of Admiralty Inlet. The majority of these sightings were two individuals observed for several days in May, June, and July 2008 between Seattle and the southern tip of Puget Sound (Orca Network

2008). The Orca Network has not recorded sightings of humpback whales in Puget Sound during winter months in the last three years.

Impacts

Potential impacts to humpback whales are similar to those described for the SRKW.

Preliminary Determination

The proposed project *may affect, but is not likely to affect* humpback whales.

The proposed project *may affect* humpback whales because:

- Humpback whales have been documented in the action area.
- In-water work is proposed that includes pile driving.
- Impact minimization measures reduce, but do not eliminate under water noise.

The proposed project *is not likely to adversely affect* humpback whales because:

- Impact minimization measures will be implemented.
- Use of the action area by humpback whales during the proposed in-water work window is limited and sporadic.
- Temporary avoidance of the action area during pile driving is not anticipated to alter foraging or behavioral activities of humpback whales.
- Potential prey items will not be significantly impacted.

6.3.7 Marbled Murrelet

Federal Status

The marbled murrelet is listed as threatened under the ESA. The USFWS is the lead regulatory agency for this listing under the ESA.

Critical Habitat

Critical habitat was designated on May 24, 1996, which is limited to upland breeding habitats. No critical habitat occurs in the action area.

Occurrence

The following occurrence information is based on the USFWS Biological Opinion (BO) for the Brightwater project (Reference 1-3-04-F-0496 [pages 69–71]). Most of the data is from sightings near Edmonds, which is due, in part, to more intensive surveys in that area. The abundance of marbled murrelets in the action area varies by season, but may occur year-round. Abundance may increase during April with the start of the nesting season, and a few may be regularly present from May through July. Juveniles have been observed in the action area by September, but by October abundance appears to decrease and observations become less frequent from November through March. However, this conflicts with another statement in the BO that states higher concentrations may occur during forage fish spawning periods (October 1 through April

15). The maximum number observed during winter months near Edmonds was up to 10, but up to 17 have been observed south of the action area during the annual Seattle Audubon Christmas Bird Counts. Discrepancies in seasonal abundance are likely due to various sources of sighting information, survey effort and timing, and variability in seasonal use from year to year. In summary, marbled murrelets could potentially be present in the action area throughout the year. The documented presence of forage fish spawning along the shoreline of Point Wells indicates that peak abundance within the nearshore marine environment may coincide with periods of peak forage fish spawning.

Impacts

Potential impacts to marbled murrelets would be similar to those described in **Section 6.2**.

Preliminary Determination

The proposed project *may affect, but is not likely to affect* marbled murrelets.

The proposed project *may affect* marbled murrelets because:

- Marbled murrelets have been documented in the action area.
- In-water work is proposed that includes pile driving.
- The in-water work window is likely to be from October 15 – February 15, which includes the time periods when they could be in the action area.
- Impact minimization measures reduce, but do not eliminate under water noise.

The proposed project *is not likely to adversely affect* marbled murrelets because:

- Impact minimization measures will be implemented.
- Temporary avoidance of the action area during pile driving is not anticipated to alter foraging or behavioral activities of marbled murrelets.
- Potential prey items will not be significantly impacted during construction.

The proposed project will have *no-effect* on critical habitat because no critical habitat occurs in the action area.

7.0 RESTORATION

Appendix A contains a set of the conceptual restoration plans, which must go through the agency review and approval process. This process will involve several jurisdictions, such as Snohomish County, WDFW, Ecology, and Corps, as well as interested parties, which may include tribes or interested citizens. The following paragraphs describe the major elements of the conceptual restoration plan.

Proposed restoration activities include pulling back the existing seawall along approximately 3,600 linear feet of shoreline. The existing OHWM is at the existing seawall, while the MHHW is outlined based on Corps elevation data for the project vicinity. The distance the existing

seawall will be pulled back is variable, ranging from 0 (southern edge) to 200 feet (outlet of new water conveyance channel). Within those two extremes, the distance tends to range between 50 and 140 feet. The new proposed OHWM would be near the base of the proposed Esplanade, which will result in the restoration of approximately 5.67 acres of nearshore intertidal habitat. This acreage does not factor in the potential inclusion of groins. Existing fill would be removed as part of the site remediation plan. Once remediation is complete, which is estimated to take several years, the new intertidal area would be backfilled with clean beach sand and gravel. The slope would vary, but generally be defined by the existing slope west of the existing seawall and the elevation at the base of the Esplanade.

Approximately 390 linear feet of open channel will be created by consolidating and daylighting flow that is currently culverted under the project site at the upper Urban Plaza and an additional 450 linear feet between the north and central urban village areas. The daylighted channel will be directly connected to Puget Sound.

Approximately 2.04 acres of upland habitat will be created along the new open water conveyance system. This upland habitat area will also be used by the public and include trails. The conceptual restoration plan proposes to install approximately 5,712 native tree and shrub species in an area currently consisting of pavement and fuel tanks. This element of the plan will eventually provide foraging and nesting habitat for multiple species of wildlife. Snags and downed logs are also proposed to provide additional wildlife function.

The project also includes the removal of approximately 327 existing creosote piles, thereby eliminating a source of PAHs from the marine environment. The existing site where development is proposed is predominantly impervious. Impervious surface in the project area will be reduced by the proposed development plan.

Based on the proposed restoration activities, implementation of impact minimization measures, and providing enhanced water quality treatment, the proposed project has the potential to benefit numerous species of fish and wildlife. A summary of the primary fish and wildlife benefits are as follows:

1. The restoration of intertidal habitat will create additional refugia and foraging habitat for marine fishes such as juvenile salmonids. This habitat type is of critical importance to juvenile salmonids and has been severely impacted by previous development within Puget Sound.
2. The restoration of intertidal habitat will create additional spawning habitat for forage fish. The potential installation of groins has not been factored into this analysis and will be addressed in additional studies associated with the EIS.
3. The potential increase in forage fish spawning habitat may increase forage fish abundance, thereby benefiting multiple species that feed on forage fish within Puget Sound. The potential installation of groins has not been factored into this analysis and will be addressed in additional studies associated with the EIS.
4. The creation of additional woodlands will provide habitat for wildlife and provide a corridor between the marine environment and existing forest along the eastern bluff.

5. The creation of an open water channel within the woodlands will provide habitat diversity and increase habitat functionality. The combined effect of native woodlands and open freshwater habitat, situated between the marine environment and forested bluffs, will provide suitable habitat for multiple species of wildlife.
6. The outlet of the open water channel will flow freely into the marine shoreline, thereby increasing habitat complexity to the benefit of both fish and wildlife.
7. The removal of large bulk fuel and oil storage containers near the shoreline will reduce the potential for a major oil spill along the marine shoreline of Puget Sound.
8. The implementation of enhanced water quality treatments will reduce the potential of stormwater runoff from impacting the marine shoreline.
9. Conversion of the site from heavy industrial to mixed use urban will reduce the potential for additional fuel or oil spills from impacting Puget Sound and reduce tanker traffic near Point Wells.
10. Demolition of the three existing ramps to the big dock and dilapidated dock will remove over one acre of shading and additional sources of PAHs.

8.0 REFERENCES

- Angliss, R.P., and R.B. Outlaw. 2005. Alaska marine mammal stock assessments, 2005. NOAA Technical Memorandum NMFS-AFSC-161, U.S. Department of Commerce, Seattle, Washington.
- Baird, R.W. 2003. Update COSEWIC status report on the harbor porpoise *Phocoena phocoena* (Pacific Ocean population) in Canada, in COSEWIC assessment and update status report on the harbour porpoise *Phocoena phocoena* (Pacific Ocean population) in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 1-22 pp.
- . 2000. The killer whales, foraging specializations and group hunting. Pages 127-153 in J. Mann, R.C. Connor, P.L. Tyack, and H. Whitehead (editors). *Cetacean societies: field studies of dolphins and whales*. University of Chicago Press, Chicago, Illinois.
- Baird, R.W., and L.M. Dill. 1995. Occurrence and behavior of transient killer whales: seasonal and pod-specific variability, foraging behavior and prey handling. *Canadian Journal of Zoology*. 73:1300-1311.
- Barlow, J. 2003. Preliminary estimates of the abundance of cetaceans along the U.S. West Coast: 1991-2001. Southwest Fisheries Science Center Administrative Report LJ-03-03. Available from SWFSC, 8604 La Jolla Shores Dr. La Jolla, California 92037. 31p. As cited in Carretta et al. 2007.
- Bigg, M.A. 1985. Status of the Steller sea lion (*Eumetopias jubatus*) and California sea lion (*zalophus californianus*) in British Columbia. *Can. Spec. Pub. Fish. Aquat. Sci.* 77. 20 p.
- Brennan, J.S., and H. Culverwell. 2004. *An Assessment of Riparian Functions in Marine Ecosystems*. Published by Washington Sea Grant Program. Copyright 2005, UW Board of Regents. Seattle, Washington. 34 p.
- Brennan, J.S., K.F. Higgins, J.R. Cordell, and V.A. Stamatiou. 2004. *Juvenile Salmon Composition, Timing, Distribution, and Diet in Marine Nearshore Waters of Central Puget Sound in 2001 – 2002*. King County Department of Natural Resources and Parks, Seattle, Washington. 164 pp.
- Brown, R., S. Jeffries, B. Wright, M. Tennis, P. Gearin, S. Riemer, and D. Hatch. 2007. Filed Report -2007 Pinniped research and management activities at Bonneville Dam. August 29.
- Calambokidis, John. 2007. Summary of collaborative photographic identification of gray whales from California to Alaska for 2004 and 2005. Cascadia Research, Olympia, Washington. June 2007.
- Calambokidis, J., and R.W. Baird. 1994. Status of marine mammals in the Strait of Georgia, Puget Sound, and the Juan de Fuca Strait, and potential human impacts. *Canadian Technical Report of Fisheries and Aquatic Sciences* 1948:282-300.

- Calambokidis, John, Erin A. Falcone, Terrance J. Quinn, Alexander M. Burdin, Phillip J. Clapham, John K.B. Ford, Christine M. Gabriele, Richard LeDuc, David Mattila, Lorenzo Rojas-Bracho, Janice M. Straley, Barbara L. Taylor, Jorge Urban R., David Weller, Briana H. Witteveen, Manami Yamaguchi, Andrea Bendlin, Dominique Camacho, Kiirsten Flynn, Andrea Havron, Jessica Huggins, and Nora Maloney. 2008. SPLASH: Structure of populations, levels of abundance and status of humpback whales in the North Pacific. Final Report for Contract AB133F-03-RP-00078. Cascadia Research Olympia, Washington. Prepared for the Department of Commerce, Western Administrative Center, Seattle, Washington. May 2008.
- Calambokidis, J., G.H. Steiger, D.K. Ellifrit, B.L. Troutman, and C.E. Bowlby. 2004. Distribution and abundance of humpback whales (*Megaptera novaeangliae*) and other marine mammals off the northern Washington coast. *Fish. Bull.* 102:563-580.
- Calambokidis, John, James D. Darling, Volker Deecke, Patrick Gearin, Merril Gosho, William Megill, Christina M Tombach, Dawn Goley, Caitlyn Toropova, and Brian Gisborne. 2002. Abundance, range and movements of a feeding aggregation of gray whales (*Eschrichtus robustus*) from California to southeastern Alaska in 1998. *J. Cetacean Res. Manage.* 4(3):267-276.
- Calambokidis, J., G.H. Steiger, J.M. Straley, T.J. Quinn, II, L.M. Herman, S. Cerchio, D.R. Salden, M. Yamaguchi, F. Sato, J. Urbán R., J. Jacobsen, O. von Ziegesar, K.C. Balcomb, C.M. Gabriele, M.E. Dahlheim, N. Higashi, S. Uchida, J.K.B. Ford, Y. Miyamura, P. Ladrón de Guevara P., S.A. Mizroch, L. Schlender, and K. Rasmussen. 1997. Abundance and population structure of humpback whales in the North Pacific Basin. Final Contract Report 50ABNF500113 to Southwest Fisheries Science Center, P.O. Box 271, La Jolla, California 92038. 72p.
- Calambokidis, John, Joseph R. Evenson, Gretchen H. Steiger, and Steven J. Jeffries. 1994. Gray whales of Washington State: natural history and photographic catalog. Cascadia Research Collective, Olympia, Washington.
- Calambokidis, J., J.C. Cubbage, J.R. Evenson, S.D. Osmeck, J.L. Laake, P.J. Gearin, B.J. Turnock, S.J. Jeffries, and R.F. Brown. 1993. Abundance estimates of harbour porpoise in Washington and Oregon waters. Report to the National Marine Mammal Laboratory, National Marine Fisheries Service, Seattle, Washington. 55 p.
- Carretta, James V., Karin A. Forney, Marcia M. Muto, Jay Barlow, Jason Baker, Brad Hanson and Mark Lowry. 2007a. US Pacific Marine Mammal Stock Assessments: 2006. NOAA-TM-NMFS-SWFSC-398. US Department of Commerce. January 2007.
- . 2007b. US Pacific Marine Mammal Stock Assessments: 2007. NOAA-TM-NMFS-SWFSC-414. US Department of Commerce. December 2007.
- Carretta, J.V., and S.J. Chivers. 2003. Preliminary estimates of marine mammal mortality and biological sampling of cetaceans in California gillnet fisheries for 2002. Paper SC/55/SM3 presented to the International Whaling Commission (unpublished). 21pp

- Center for Whale Research. 2008. The Center for Whale Research, Friday Harbor, Washington. Website: <http://www.whaleresearch.com/thecenter/research.html>. Accessed on January 9, 2008.
- Code of Federal Regulations (C.F.R.). 2008. Regulations governing the taking and importing of marine mammals. Title 50, Chapter II, Subchapter C, Part 216. December.
- Cooke, Sarah Spear. 2000. Wetland and Buffer Functions Semi-Quantitative Assessment Methodology. Seattle, Washington.
- . 1997. A Field Guide to the Common Wetland Plants of Western Washington & Northwestern Oregon. Seattle Audubon Society, Seattle, Washington.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Office of Biological Services, USFWS, FWS/OBS-79/31.
- Dvornich, K.M., K.R. McAllister, and K.B. Aubry. 1997. *Amphibians and Reptiles of Washington State, Location Data and Predicted Distributions*. Washington State Gap Analysis Project Final Report – Volume 2.
- Environmental Laboratory. 1987. *U.S. Army Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.
- Everitt, R.D., C.H. Fiscus, and R.L. DeLong. 1980. Northern Puget Sound Marine Mammals. DOC/EPA Interagency Energy/ Environ. R&D Program. Doc. #EPA-6009/7-80-139, U.S. Environmental Protection Agency, Washington, D.C. 134 p.
- Federal Register. 2006. Endangered and threatened species; Designation of critical habitat for the Southern Resident Killer Whale; Final Rule. 50 CFR Part 226. Vol. 71, No. 229, pp. 690540-069070.
- Ford, J.K.B., and G.M. Ellis. 1999. Transients: mammal-hunting killer whales of British Columbia, Washington, and southeastern Alaska. UBC Press, Vancouver, British Columbia.
- Ford, J.K.B., G.M. Ellis, and K.C. Balcomb. 2000. Killer whales: the natural history and genealogy of *Orcinus orca* in British Columbia and Washington State. 2nd ed. UBC Press, Vancouver, British Columbia.
- . 1994. Killer whales: the natural history and genealogy of *Orcinus orca* in British Columbia and Washington State. UBC Press, Vancouver, British Columbia.
- Forney, K.A. 2007. Preliminary estimates of cetacean abundance along the U.S. West Coast and within four National Marine Sanctuaries during 2005. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-SWFSC-406. 28 pp.

- Gaskin, D.E. 1984. The harbor porpoise (*Phocoena phocoena* L.): regional populations, status, and information on direct and indirect catches. Rep. int. Whal. Commn 34:569-586.
- Gearin, P., R. Pfeifer, and S. Jeffries. 1986. Control of California sea lion predation of winter-run steelhead at the Hiram M. Chittenden Locks, Seattle, December 1985-April 1986 with observations on sea lion abundance and distribution in Puget Sound. Washington Department of Game Fishery Management Report 86-20, Olympia, Washington. 108 p.
- Green, G., R.A. Grotefendt, M.A. Smultea, C.E. Bowlby, and R.A. Rowlett. 1993. Delphinid aerial surveys in Oregon and Washington waters. Final Report prepared for NMFS, National Marine Mammal Laboratory, 7600 Sand Point Way, NE, Seattle, Washington, 98115. Contract #50ABNF200058.
- Hall, A.M. 2004. Seasonal abundance, distribution and prey species of harbour porpoise (*Phocoena phocoena*) in southern Vancouver Island waters. Master Thesis. University of British Columbia.
- Hitchcock, C.L., and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle, Washington.
- Jeffries S.J., P.J. Gearin, H.R. Huber, D.L. Saul, and D.A. Pruett. 2000. Atlas of seal and sea lion haulout sites in Washington. Washington Department of Fish and Wildlife, Wildlife Science Division, 600 Capitol Way North, Olympia, Washington. 150 p.
- Jeffries, Steven, Harriet Huber, John Calambokidis, and Jeffrey Laake. 2003. Trends and status of harbor seals in Washington State: 1978-1999. *Journal of Wildlife Management* 67(1): 208-219.
- Johnson, J.H., and A.A. Wolman. 1984. The humpback whale, *Megaptera novaeangliae*. *Mar. Fish. Rev.* 46(4):30-37.
- Johnson, R.E., and K.M. Cassidy. 1997. Terrestrial Mammals of Washington State: Location Data and Predicted Distributions. Volume 3 in Washington State Gap Analysis – Final Report, (K. M. Cassidy, C. E. Grue, M. R. Smith and K. M. Dvornich, eds.), Washington Cooperative Fish and Wildlife Research Unit, University of Washington, Seattle, 304 pp.
- Jones & Stokes. 2004. Biological Assessment for the Brightwater Treatment System. January 5. (J&S 09343.99.) Bellevue, WA. Prepared for King County, Department of Natural Resources and Parks, Wastewater Treatment Division, Seattle, Washington.
- King County. 2009. *Water Quality Status Report for Marine Waters, 2005-2007*. Prepared by King County Department of Natural Resources and Parks, Water and Land Resources Division, Marine & Sediment Group. Seattle, Washington. April, 2009.
- . 2004. *Juvenile Salmonid Composition, Timing, Distribution, and Diet in Marine Nearshore Waters of Central Puget Sound in 2001 – 2002*. Prepared by King County Department of Natural Resources and Parks, Water and Land Resources Division. Seattle, Washington. August.

- Krahn, M.M., M.J. Ford, W.F. Perrin, P.R. Wade, R.P. Angliss, M.B. Hanson, B.L. Taylor, G. Ylitalo, M.E. Dahlheim, J.E. Stein, and R.S. Waples. 2004. 2004 Status review of Southern Resident killer whales (*Orcinus orca*) under the Endangered Species Act. U.S. Dep. Commer., NOAA Tech. Memo NMFSNWFSC-62. 73 pp.
- Miller, E. 1988. Summary of research on the behavior and distribution of Dall's porpoise (*Phocoenoides dalli*) in Puget Sound (May-December, 1987). Unpublished report to the National Marine Mammal Laboratory, Northwest and Alaska Fisheries Center, 7600 Sand Pt. Way N.E., Bldg. 4, Seattle, Washington 98115.
- National Marine Fisheries Service (NMFS). 2008a. Recovery Plan for Southern Resident Killer Whales (*Orcinus orca*). National Marine Fisheries Service, Northwest Region, Seattle, Washington. January 2008.
- . 2008b. Minke Whale (*Balaenoptera acutorostrata*). NOAA Fisheries Office of Protected Resources website. Accessed August 20, 2008.
<http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/minkewhale.htm>.
- . 2006. Endangered Species Act Section 7 Informal Consultation for the Brightwater Wastewater Treatment System. NMFS Tracking No: I/NWR/2006/03121.
- . 2004. Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Brightwater Wastewater Treatment System (COE Reference 200201289). NMFS Tracking No. 2004/00148.
- . 2000. U.S. Pacific marine mammal stock assessments: 2000. National Marine Fisheries Service - Southwest Fisheries Science Center Draft. January 2000.
- . 1993. 50 CFR 226.202 – Critical Habitat for Steller Sea Lions. Title 50 – Wildlife and Fisheries Department of Commerce. Part 226 – Designated Critical Habitat. U.S. Department of Commerce.
- Nysewander D. R., J. R. Evenson, B. L. Murphie, and T. A. Cyra. 2005. *Report of Marine Bird and Marine Mammal Component, Puget Sound Ambient Monitoring Program, for July 1992 to December 1999 Period*. Prepared for Washington State Department of Fish and Wildlife and Puget Sound Action Team. January 31, 2005 Final Revision. Olympia, Washington.
- Orca Network. 2008. Recent whale sightings in the Salish Sea (Puget Sound, Northwest Straights, Gulf Islands and Georgia Strait) Sightings Archives. Available at
<http://www.orcanetwork.org/sightings/map.html>.
- Osborne, R., J. Calambokidis, and E.M. Dorsey. 1988. A guide to marine mammals of greater Puget Sound. 191 p. Island Publishers, Anacortes, Washington.
- Osborne, R.W. 1999. A historical ecology of Salish Sea “resident” killer whales (*Orcinus orca*): with implications for management. Ph.D. Thesis, University of Victoria, Victoria, British Columbia.

- Osborne, R.W., J.M. Olson, and R.E. Tallmon. 2001. "Southern Resident Killer Whale Habitat Use at Different Time Scales Using Sighting and Photo-Identification Records." Abstract of a paper presented to the 14th Biennial Conference on the Biology of Marine Mammals, Vancouver, B.C.
- Osmek, S., P. Rosel, A. Dizon, and R. DeLong. 1994. Harbor porpoise, *Phocoena phocoena*, population assessment in Oregon and Washington, 1993. 1993 Annual Report to the MMPA Assessment Program, Office of Protected Resources, NMFS, NOAA, 1335 East-West Highway, Silver Spring, MD 20910. 14 pp. Available at National Marine Mammal Laboratory, 7600 Sand Point Way NE, Seattle, Washington 98115.
- Pitcher, K.W., P.F. Olesiuk, R.F. Brown, M.S. Lowry, S.J. Jeffries, J.L. Sease, W.L. Perryman, C.E. Stinchcomb, and L.F. Lowry. 2007. Abundance and distribution of the eastern North Pacific Steller sea lion (*Eumetopias jubatus*) population. *Fish. Bull.* 107:102–115.
- Pojar, J., and A. MacKinnon. 1994. Plants of the Pacific Northwest Coast. B.C. Ministry of Forests and Lone Pine Publishing. Redmond, Washington.
- Reed, P.B. 1988. National List of Plant Species that Occur in Wetlands: Northwest (Region 9). U.S. Department of the Interior, Fish and Wildlife Service. Biological Report 88.
- Reeves, R.R., B.S. Stewart, P.J. Clapham, J.A. Powell, and P.A. Folkens. 2002. Guide to Marine Mammals of the World. New York, Alfred A. Knopf. p. 402-405.
- Rice, D.W. 1978. The humpback whale in the North Pacific: distribution, exploitation, and numbers. Pp. 29-44. IN: K.S. Norris and R.R. Reeves (eds). Report on a Workshop on Problems Related to Humpback Whales (*Megaptera novaeangliae*) in Hawaii. Contr.Rept. to U.S. Marine Mammal Comm. NTIS PB-280-794. 90pp.
- Rugh, D., J. Breiwick, M. Muto, R. Hobbs, K. Sheldon, C. D'Vincent, I.M. Laursen, S. Reif, S. Maher, and S. Nilson. 2008. Report of the 2006-2007 census of the eastern North Pacific stock of gray whales. AFSC Processed Rep. 2008-03, 157 p. Alaska Fish. Sci. Cent., NOAA, Natl. Mar. Fish. Serv., 7600 Sand Point Way NE, Seattle, Washington 98115.
- Simenstad, C.A., B.J. Nightingale, R.M. Thom, and D.K. Shreffler. 1999. Impacts of Ferry Terminals on Juvenile Salmon Migrating along Puget Sound Shorelines Phase I: Synthesis of State of Knowledge. Prepared for the Washington State Transportation Commission and U.S. Department of Transportation. Research Project T9903. Available on the www at: <http://www.wsdot.wa.gov/research/reports/fullreports/472.1.pdf>
- Smith, M.R., P.W. Mattocks, Jr., and K.M. Cassidy. 1997. Breeding Birds of Washington State. Volume 4 in Washington State Gap Analysis – Final Report, (K.M. Cassidy, C.E. Grue, M.R. Smith, and K.M. Dvornich, eds.), Seattle Audubon Society Publications in Zoology No. 1, Seattle, 538 pp.
- Snohomish County. 1987. Snohomish County Stream and Wetland Survey. Produced by Snohomish County Public Works and the Department of Planning and Community Development, Planning Division. Snohomish County, Washington.

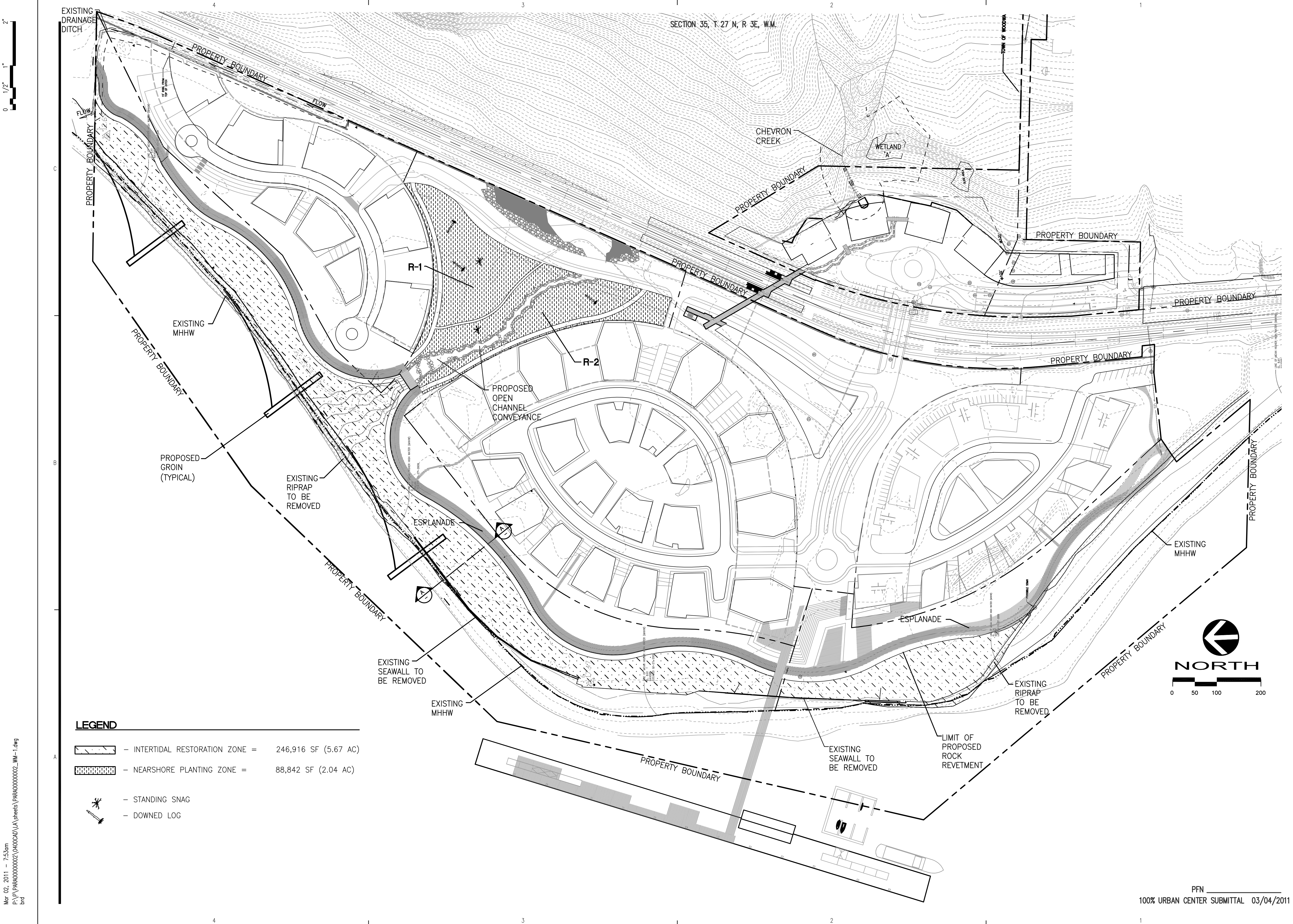
- Stark, Kimberle. 2010. Personal Communication. Unpublished data from King County Department of Natural Resources & Parks. Seattle, Washington.
- Steiger, G.H. and J. Calambokidis. 1986. California and northern sea lions in southern Puget Sound, Washington. *Murrelet* 67:93-96.
- Stewart, B.S., B.J. Le Boeuf, P.K. Yochem, H.R. Huber, R.L. DeLong, R.J. Jameson, W. Sydeman, and S.G. Allen. 1994. History and present status of the northern elephant seal population. In: B. J. Le Boeuf and R. M. Laws (eds.) *Elephant Seals*. Univ. Calif. Press, Los Angeles.
- SvR Design Company. 2010. Point Wells Development – Draft Targeted Drainage Report. March 26, 2010. SvR Design Company. Seattle, Washington.
- United States Army Corps of Engineers (Corps). 2005. Depart of the Army Permit for the King County Regional Wastewater Treatment System. Permit Number 200201289. Issued on June 15, 2005 by the Department of the Army, Seattle District, US Army Corps of Engineers to King County Department of Natural Resources.
- United States Department of Agriculture. Soil Conservation Service (SCS). 1983. Soil Survey of the Snohomish County Area. U.S. Government Printing Office, Washington D.C.
- United States Fish and Wildlife Service (USFWS). 2005. Letter to T.F. Mueller, U.S. Army Corps of Engineers, dated January 20, 2005. Ref: 1-3-04-F-0496; X-ref: 1-3-04-SP-0027. U.S. Department of the Interior, Fish and Wildlife Service, Western Washington office, Lacey, Washington.
- Walker, W.A., M.B. Hanson, R.W. Baird, and T.J. Guenther. 1998. Food habits of the harbor porpoise, *Phocoena phocoena*, and Dall's porpoise, *Phocoenoides dalli*, in the inland waters of British Columbia and Washington. AFSC Processed Report 98-10, Marine Mammal Protection Act and Endangered Species Act Implementation Program 1997.
- Washington State Department of Ecology (Ecology). 2005. *2005 Stormwater Management Manual for Western Washington*. February. Publication # 05-10-029 through 05-10-033; replaces Publication # 99-11 through 99-15.
- . 2004. Washington State Wetland Rating System for Western Washington, Revised. Ecology Publication # 04-06-025 prepared by Thomas Hruby, August 2004.
- . 1997. Washington State Wetlands Identification and Delineation Manual. Publication No. 96-94. Ecology, Olympia, Washington.
- Washington State Department of Fish and Wildlife. 2010. Priority Habitat and Species Data – Habitats and Species Report in the Vicinity of T27R03E Section 35 dated January 21, 2010.
- . 2008. Marine Bird and Mammal Component, Puget Sound Ambient Monitoring Program (PSAMP), 1992 - 2008. WDFW Wildlife Resources Data Systems.

- Washington State Department of Natural Resources (WDNR). 2010. Rare Plant Self-Service system via the world wide web for specific townships, ranges, and sections:
http://www.dnr.wa.gov/ResearchScience/HowTo/ConservationRestoration/Pages/amp_nh_data_instructions.aspx
- Washington State Department of Transportation (WSDOT). 2010. Biological Assessment Preparation for Transportation Projects – Advanced Training Manual. February 2010. WSDOT, Environmental Services. Olympia, Washington.
- Weitkamp, L.A., R.C. Wissmar, C.A. Simenstad, K.L. Fresh, and J.G. Odell. 1992. Gray whale foraging on ghost shrimp (*Callinassa californiensis*) in littoral sand flats of Puget Sound, USA. *Can. J.Zool.* 70(11):2275-80.
- Whale Museum. 2008a. Whale sighting hotline data.
<http://www.whalemuseum.org/hotlinefolder/update.html>. Accessed June 19, 2008.
- . 2008b. Days/months orcas have been detected in Puget Sound. <http://www.whalemuseum.org/education/library/whalewatch/pugetsound.html>. Accessed on July 10, 2008.
- Williams, R.W., R.M. Laramie and J.J. Ames. 1975. *A Catalog of Washington Streams and Salmon Utilization – Volume I, Puget Sound Region*. Washington Department of Fisheries.
- Wiles, G.J. 2004. Washington State status report for the killer whale. Washington Department Fish and Wildlife, Olympia, Washington. 106 pp.

APPENDIX A

SITE PLANS AND RESTORATION DESIGN SHEETS

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Job Number	169009.000
Drawn	GBK
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Approved	SASW
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SHORELINE RESTORATION PLAN

Sheet

RP-1

PRELIMINARY DRAFT
NOT Issued for Construction

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PFN _____
100% URBAN CENTER SUBMITTAL 03/04/2011



SECTION 35, T 27 N, R 3E, W.M.

NOTES:

GENERAL

1. PRE-CONSTRUCTION MEETING BETWEEN THE OWNER, CONTRACTOR AND RESTORATION CONSTRUCTION MONITOR SHALL OCCUR PRIOR TO CONSTRUCTION. ALL MODIFICATIONS TO THE PLAN BASED ON FIELD CONDITIONS DURING CONSTRUCTION SHALL BE APPROVED BY THE RESTORATION CONSTRUCTION MONITOR.

2. INSTALL TEMPORARY EROSION AND SEDIMENT CONTROLS IN CONFORMANCE WITH THE PROJECT'S STORMWATER POLLUTION PREVENTION PLAN.

3. RESTORATION PLANTING AREAS SHALL BE AMENDED WITH 12" OF TWO-WAY MIX TOPSOIL CONSISTING OF 50% SANDY LOAM AND 50% COMPOST BY VOLUME.

PLANTING GENERAL

1. ALL PLANT MATERIALS SHALL CONFORM TO THE AMERICAN NURSERY LANDSCAPE ASSOCIATION (ANLA) STANDARDS FOR NURSERY STOCK (ANSI Z 60.1-2004) FOR GRADE AND SIZE UNLESS NOTED OTHERWISE ON PLAN.

2. PLANT SUBSTITUTIONS SHALL BE AUTHORIZED BY THE RESTORATION CONSTRUCTION MONITOR.

3. THE CONTRACTOR SHALL VERIFY THAT PLANT INSTALLATION CONDITIONS ARE SUITABLE WITHIN PLANTING AREAS. THE CONTRACTOR SHALL NOTIFY THE RESTORATION CONSTRUCTION MONITOR OF ANY UNSATISFACTORY CONDITIONS AND ADDRESS THEM PRIOR TO START OF PLANTING. BEGINNING OF WORK CONSTITUTES VERIFICATION THAT CONDITIONS ARE SATISFACTORY.

PLANT INSTALLATION

1. RESTORATION CONSTRUCTION MONITOR SHALL INSPECT THE METHOD AND LAYOUT OF PLANTING IN THE PLANTING AREAS PRIOR TO PLANT INSTALLATION.

2. ALL TREES AND SHRUBS SHALL BE INSTALLED PER THE RESTORATION PLAN AND AS SHOWN IN THE PLANTING DETAILS.

3. ALL PLANT PITS SHALL RECEIVE MEDIUM BARK MULCH RINGS: 3" DEEP X APPROXIMATELY TWICE THE ROOTBALL DIAMETER.

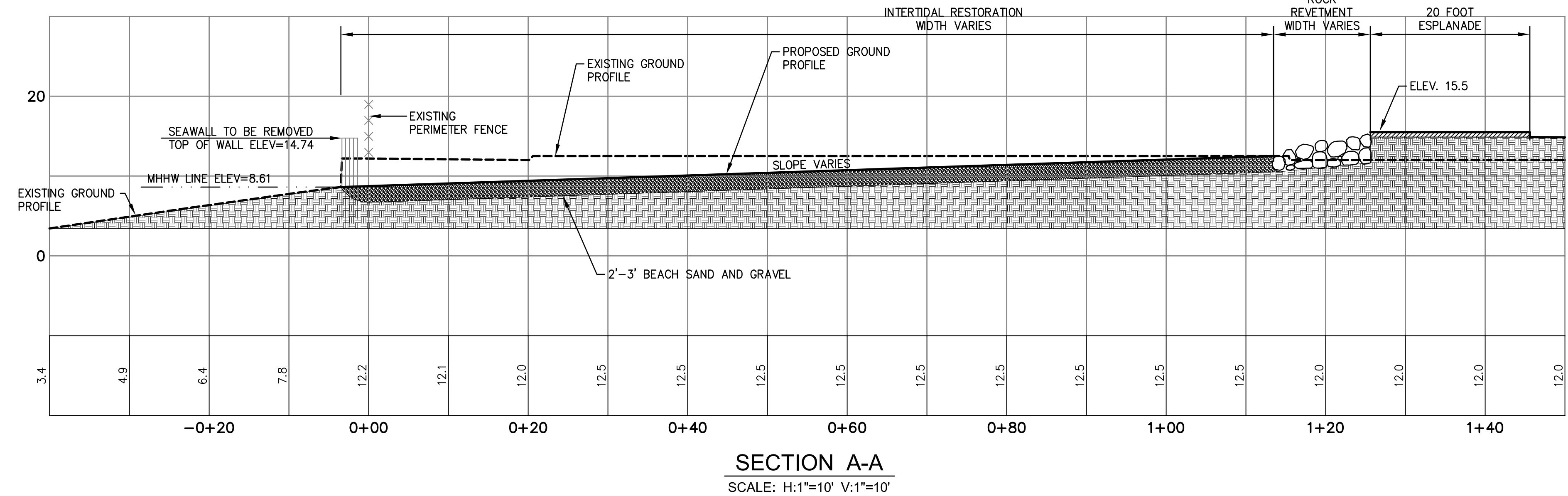
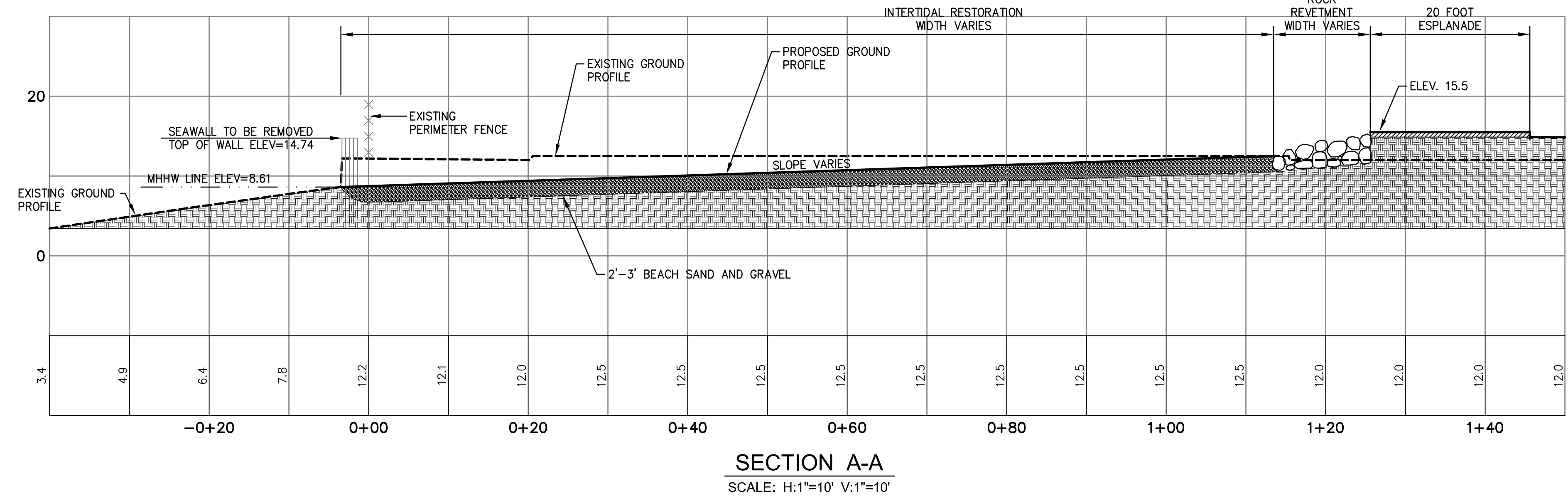
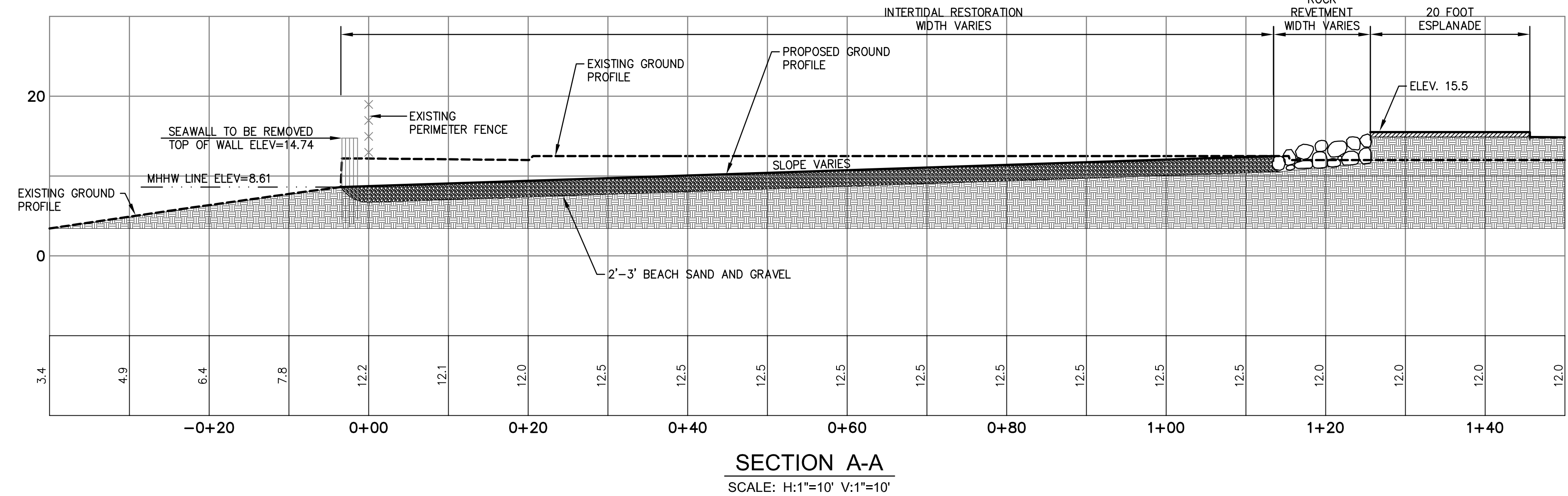
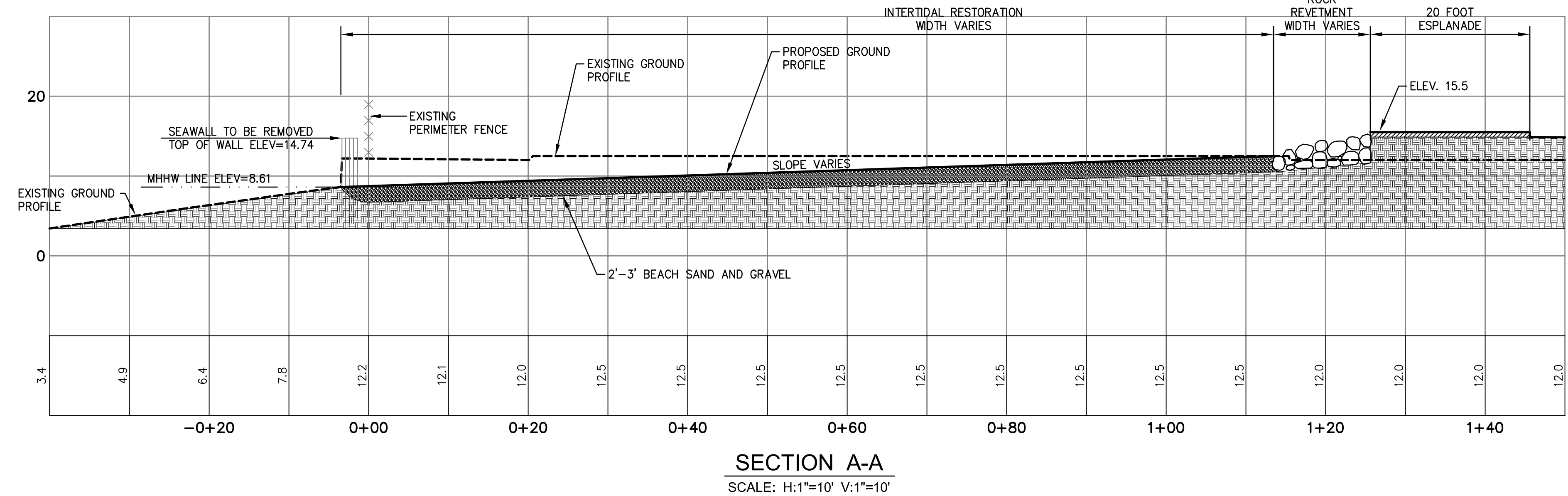
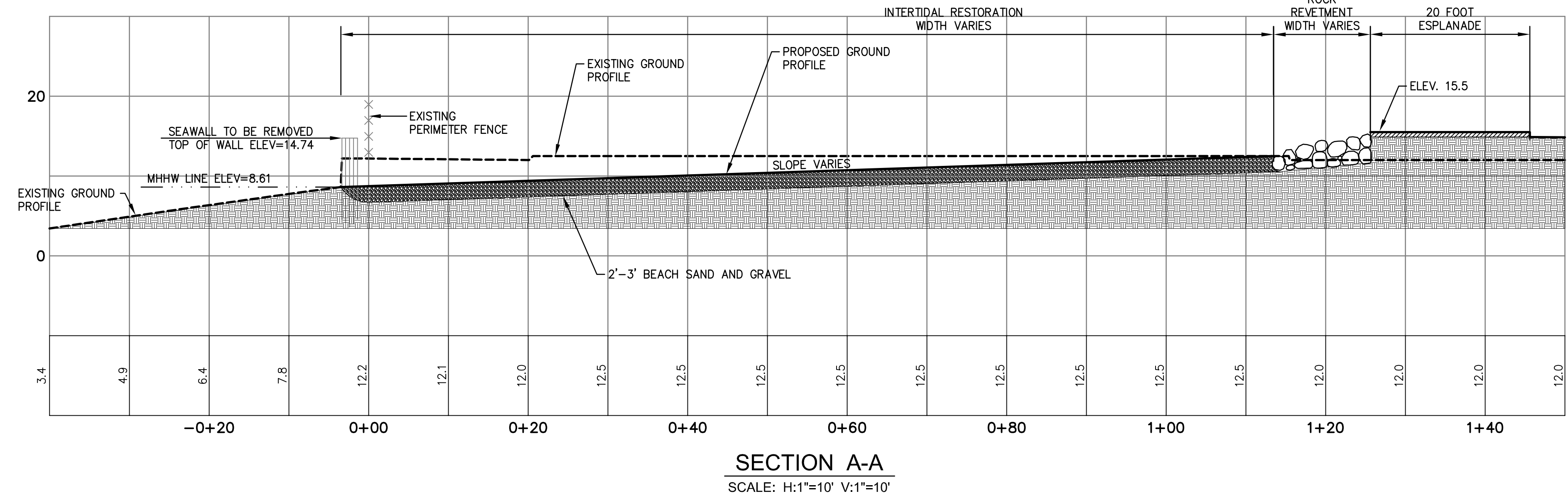
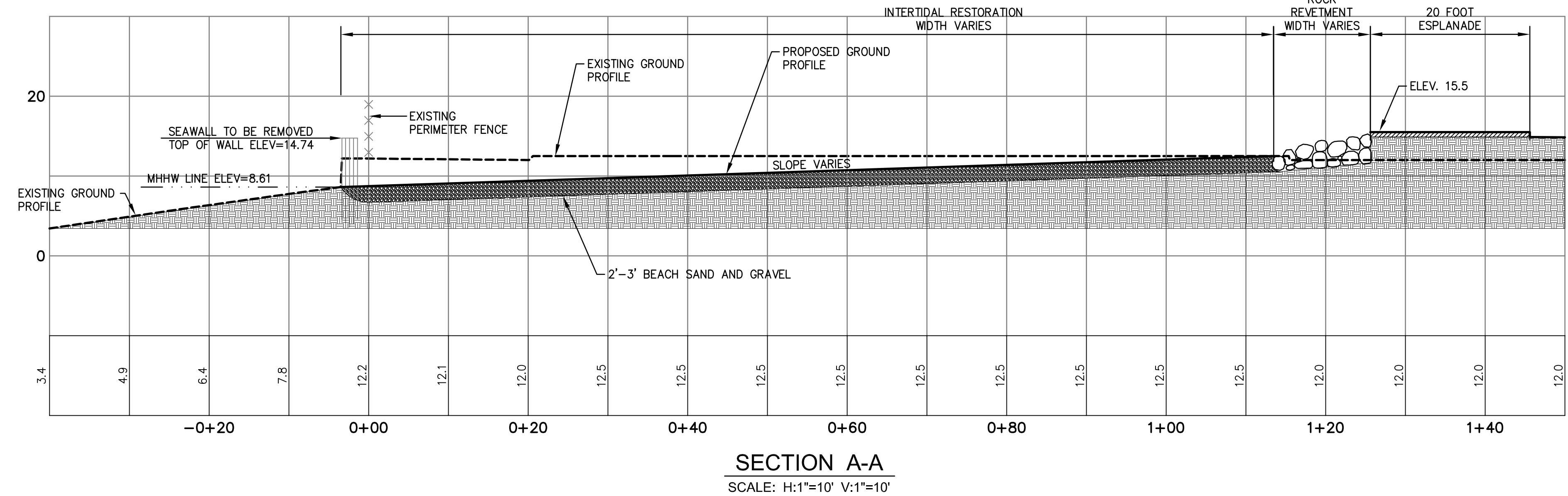
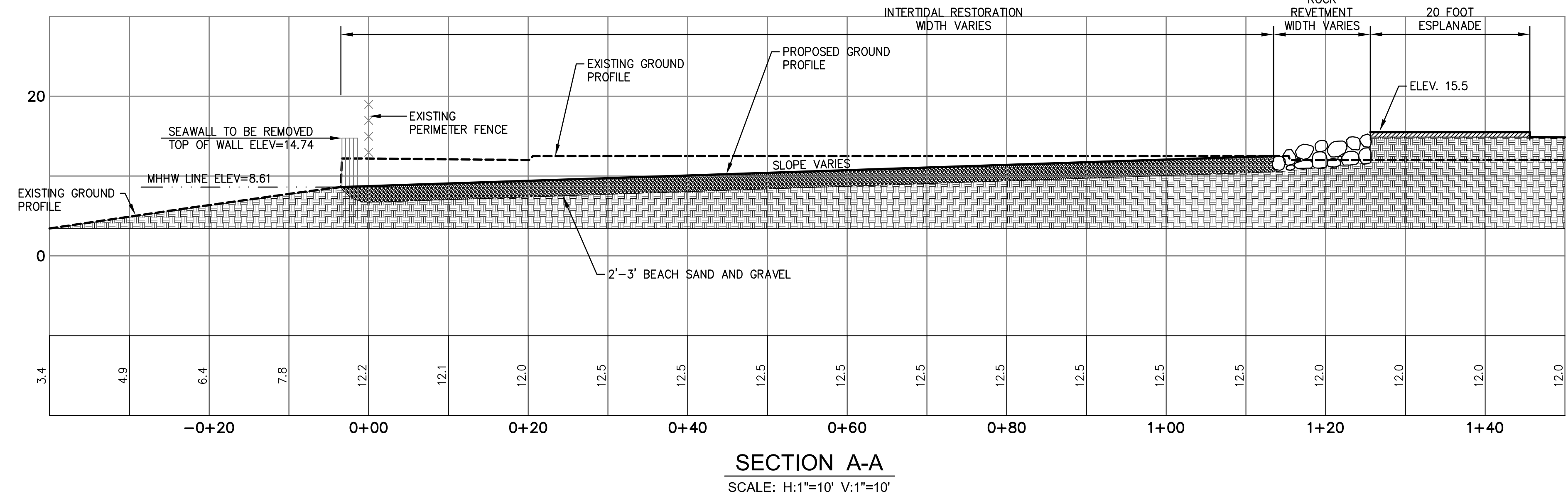
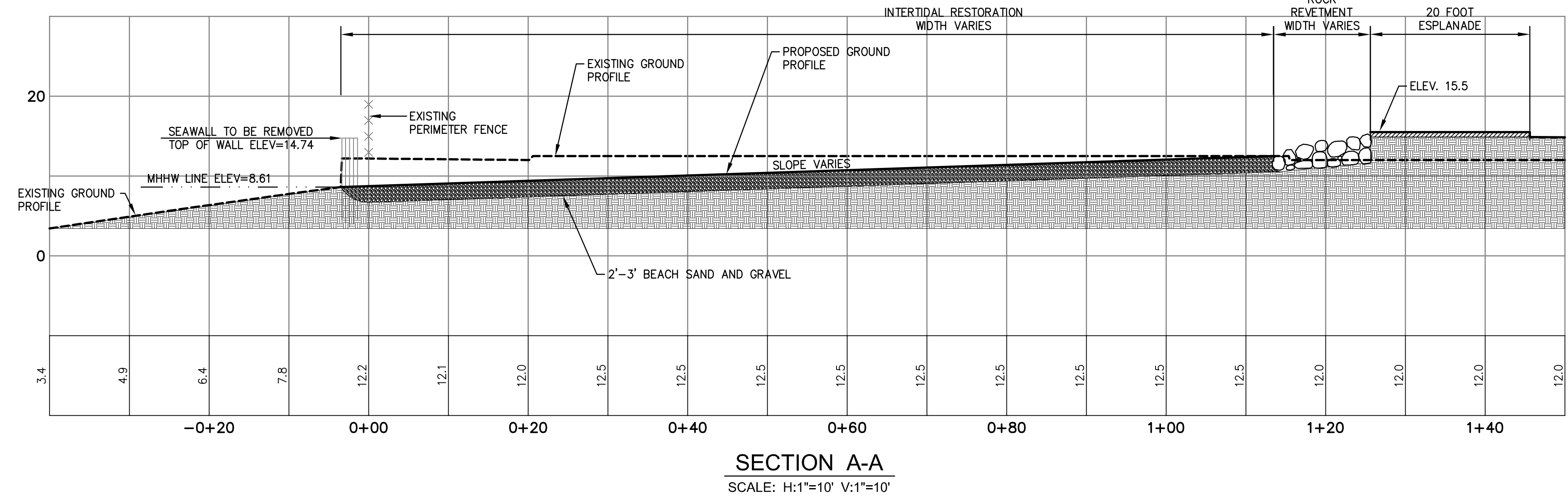
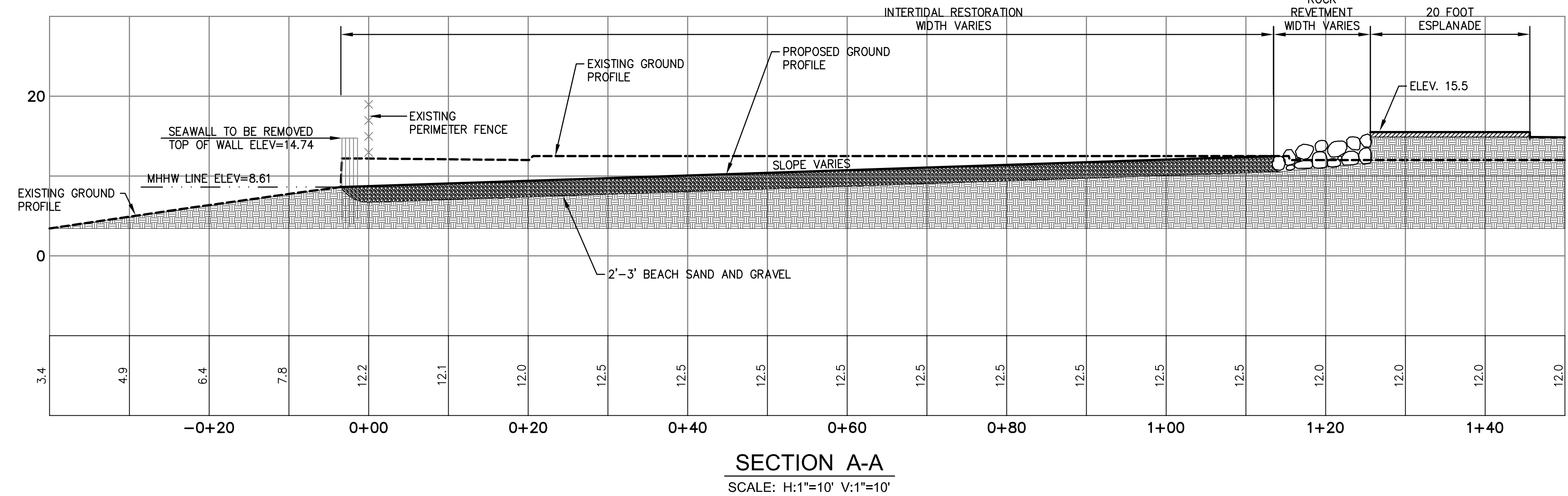
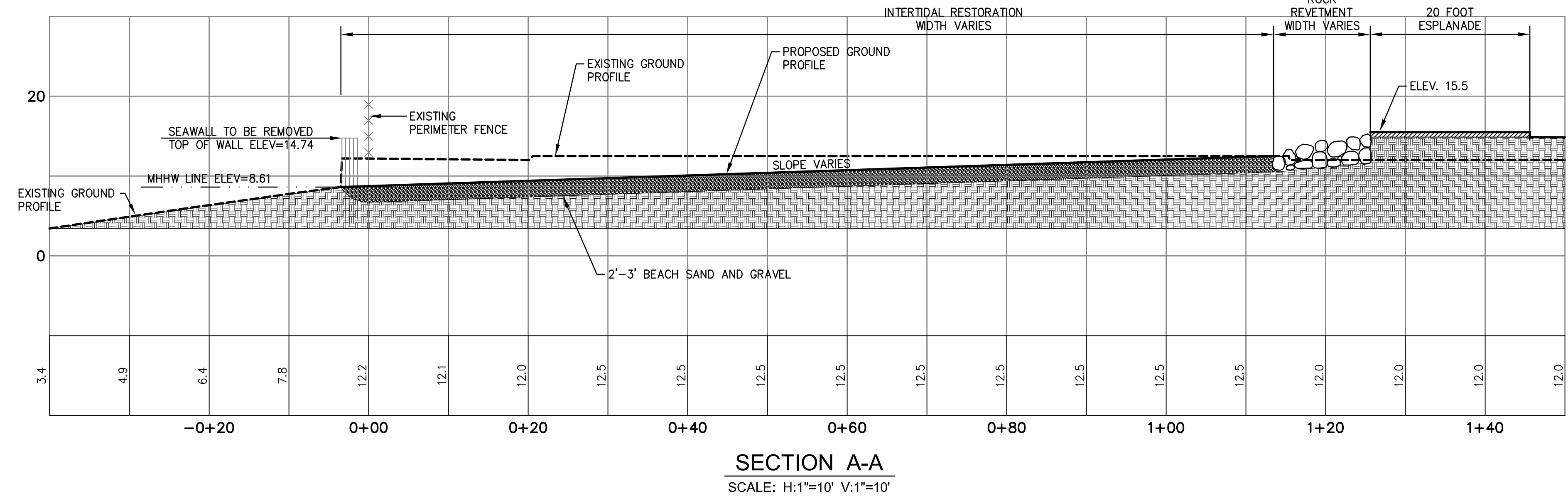
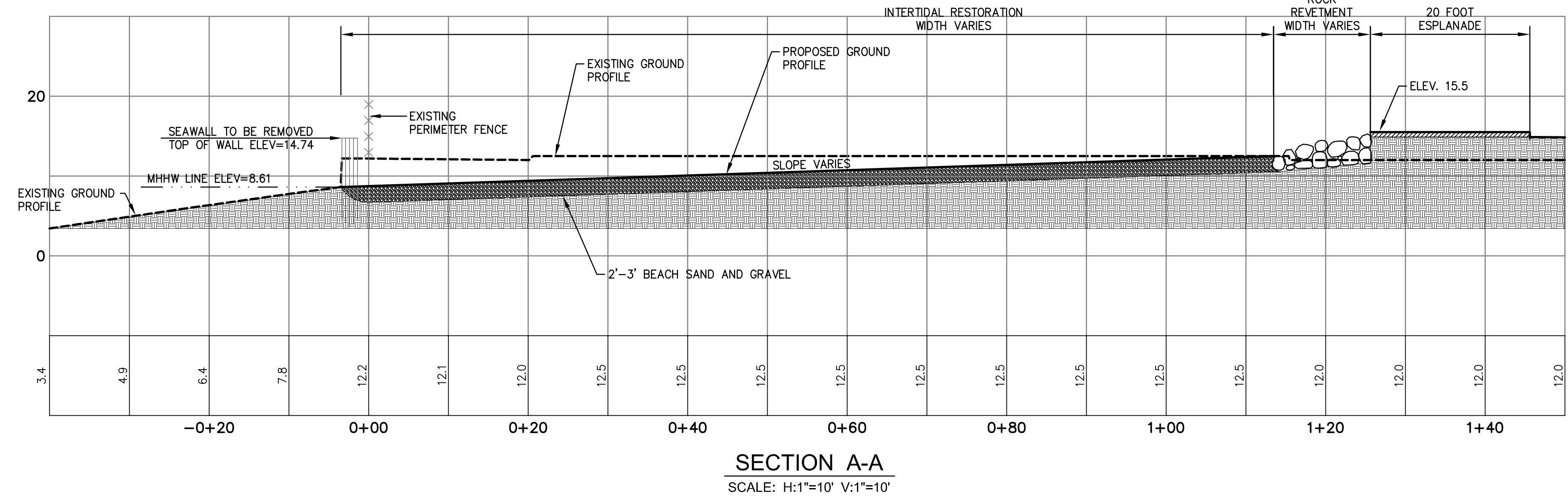
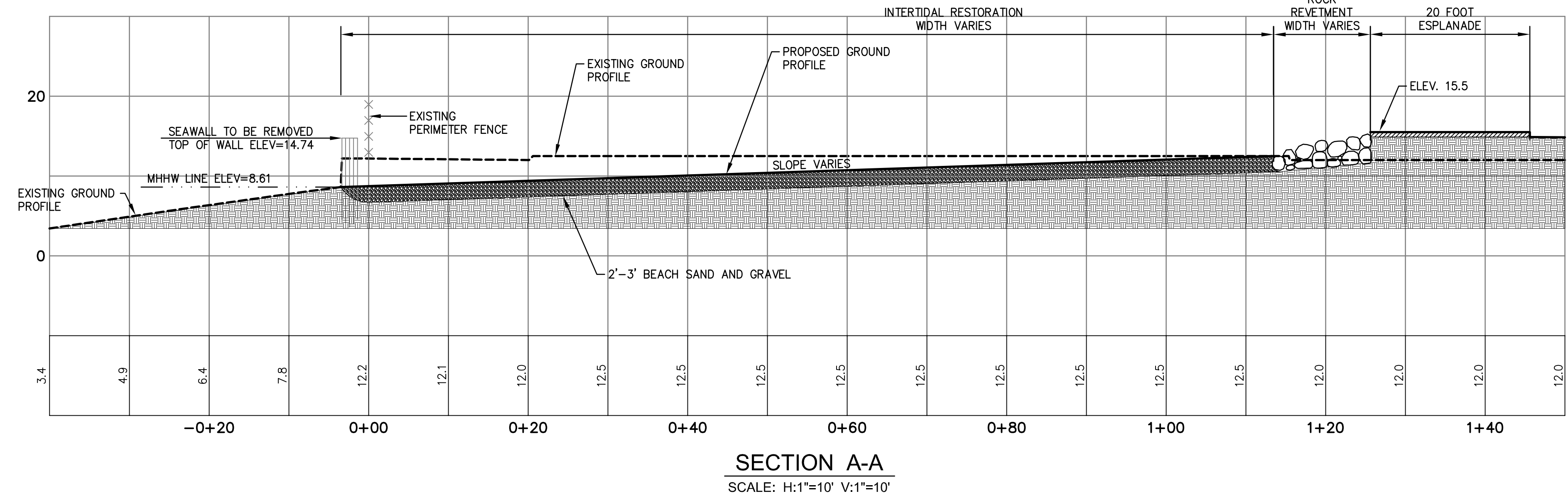
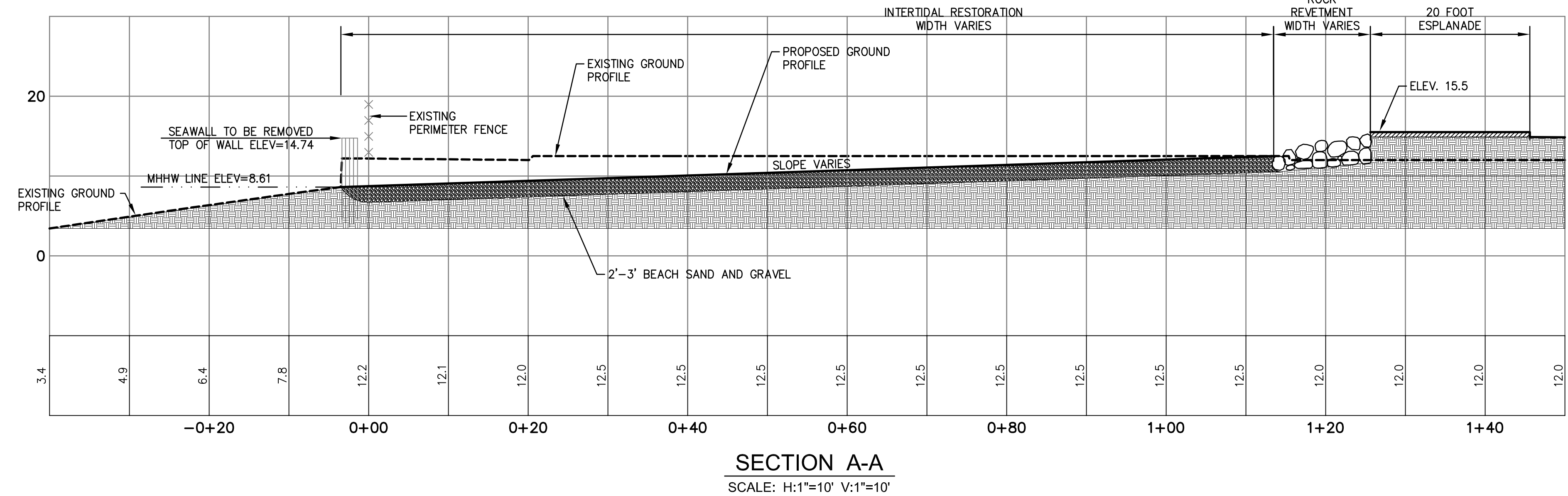
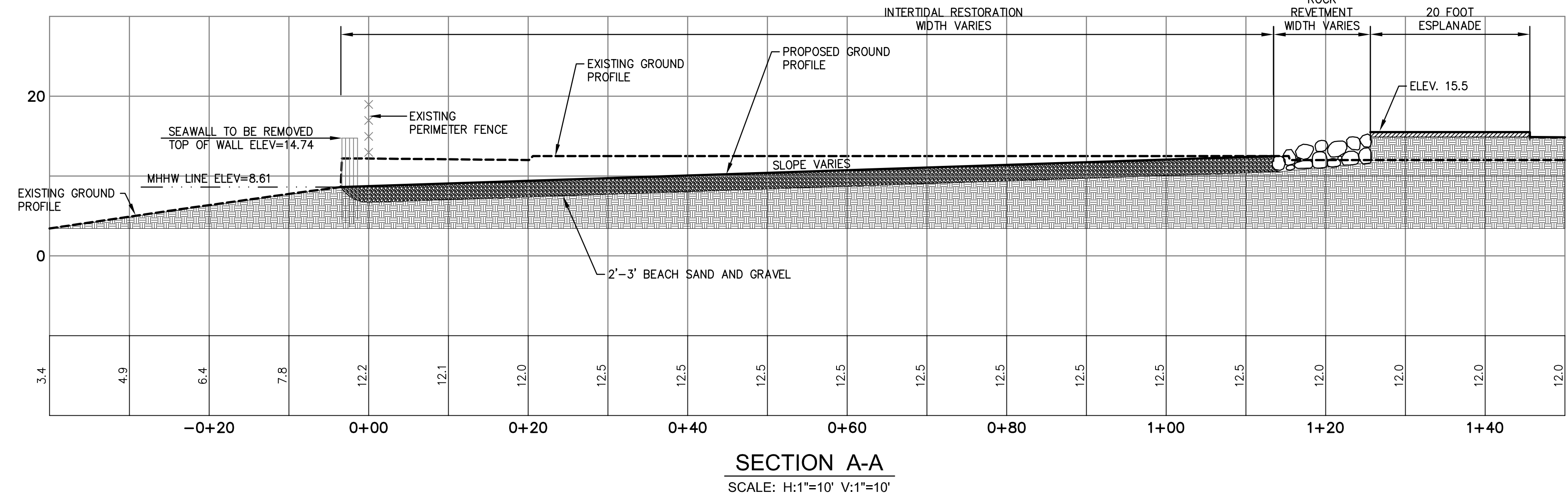
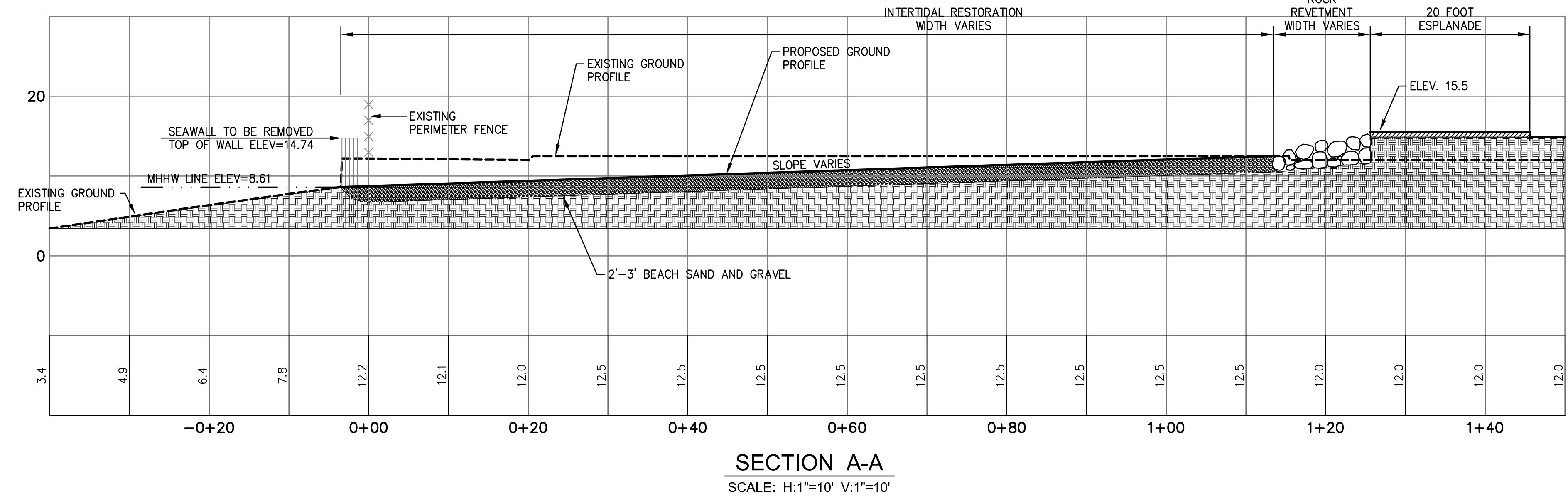
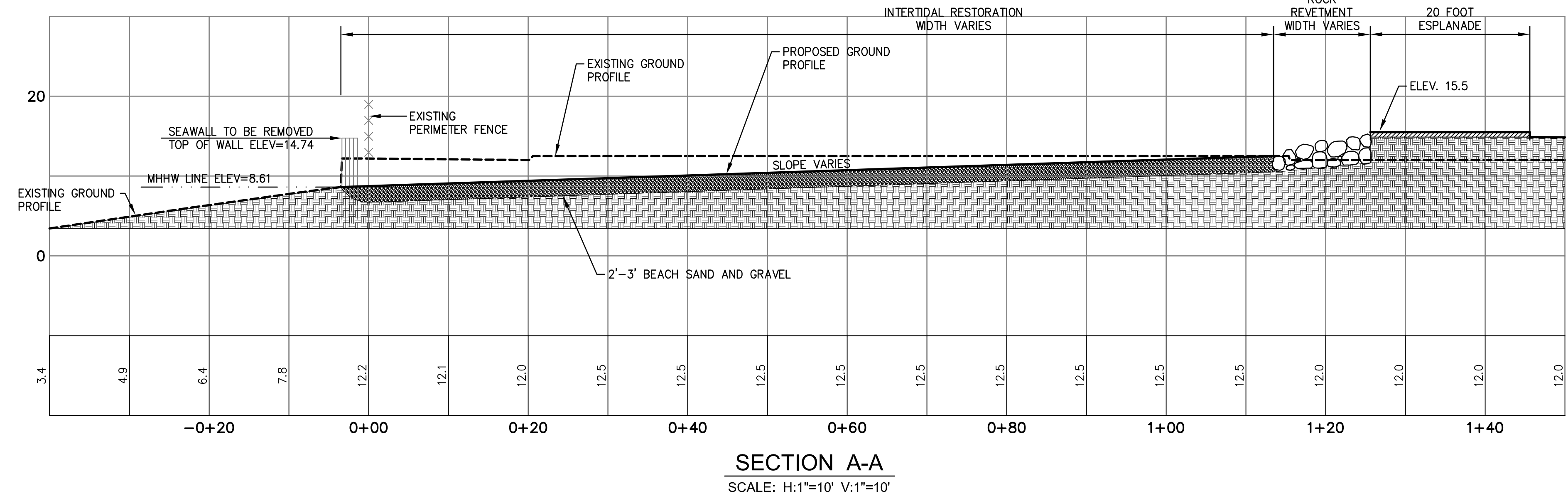
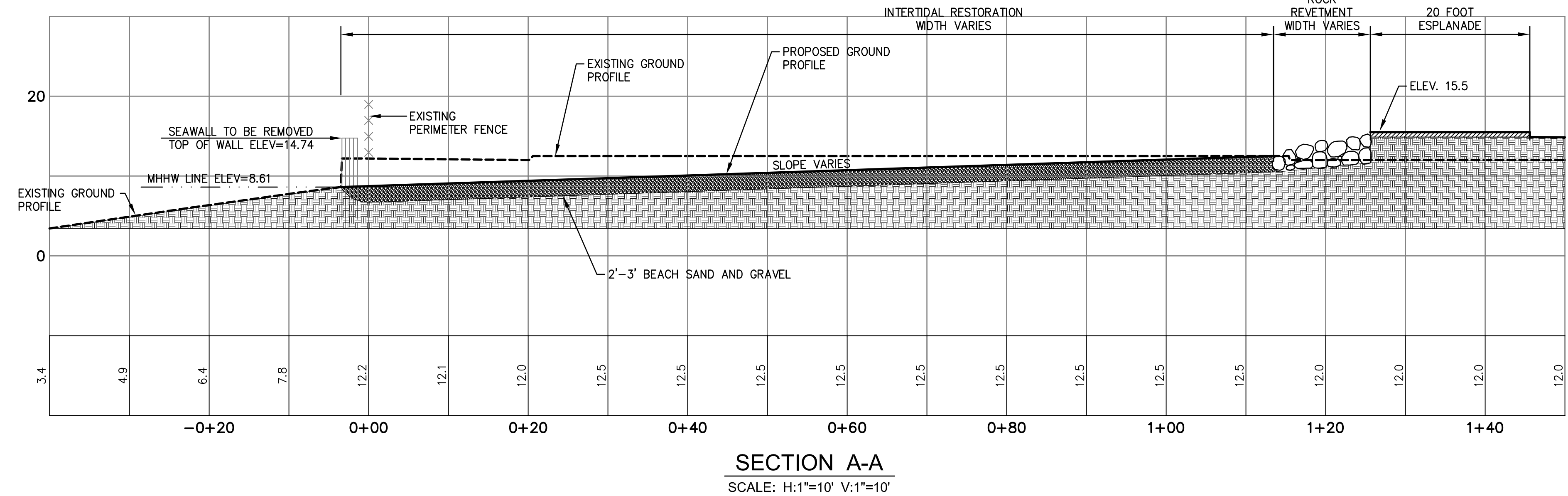
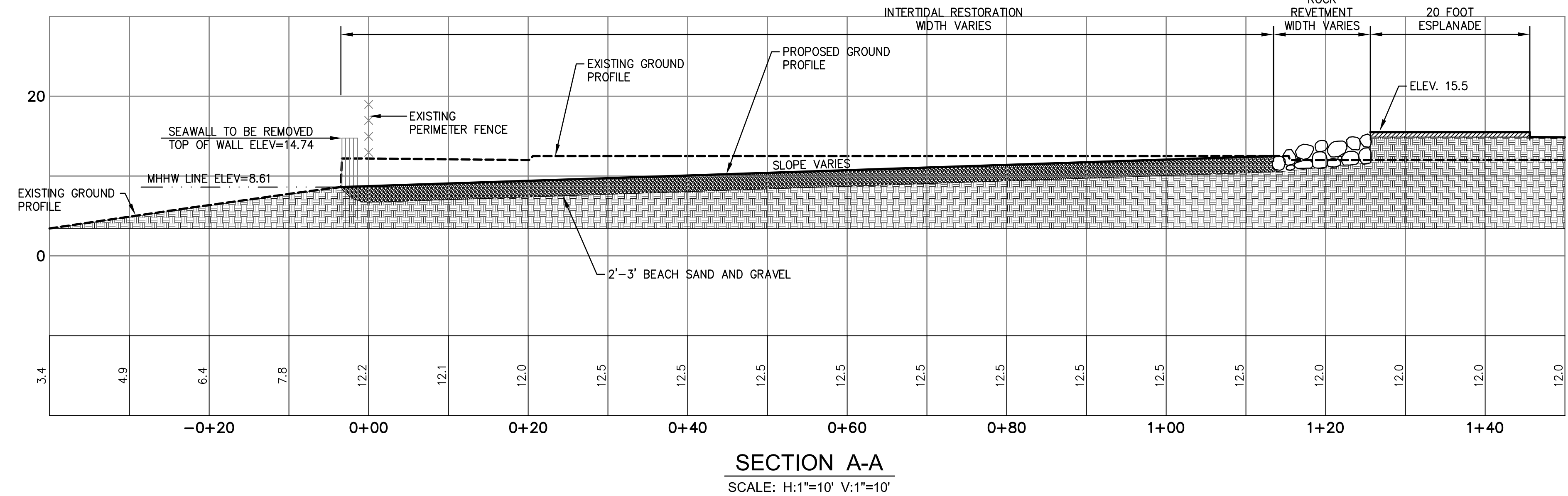
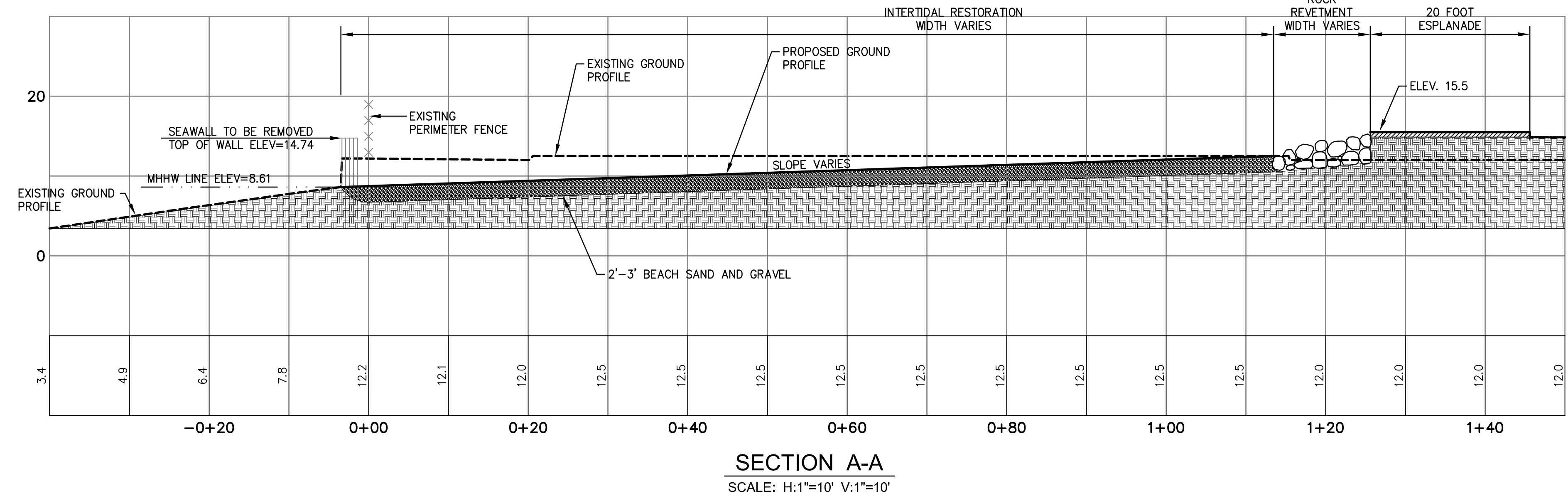
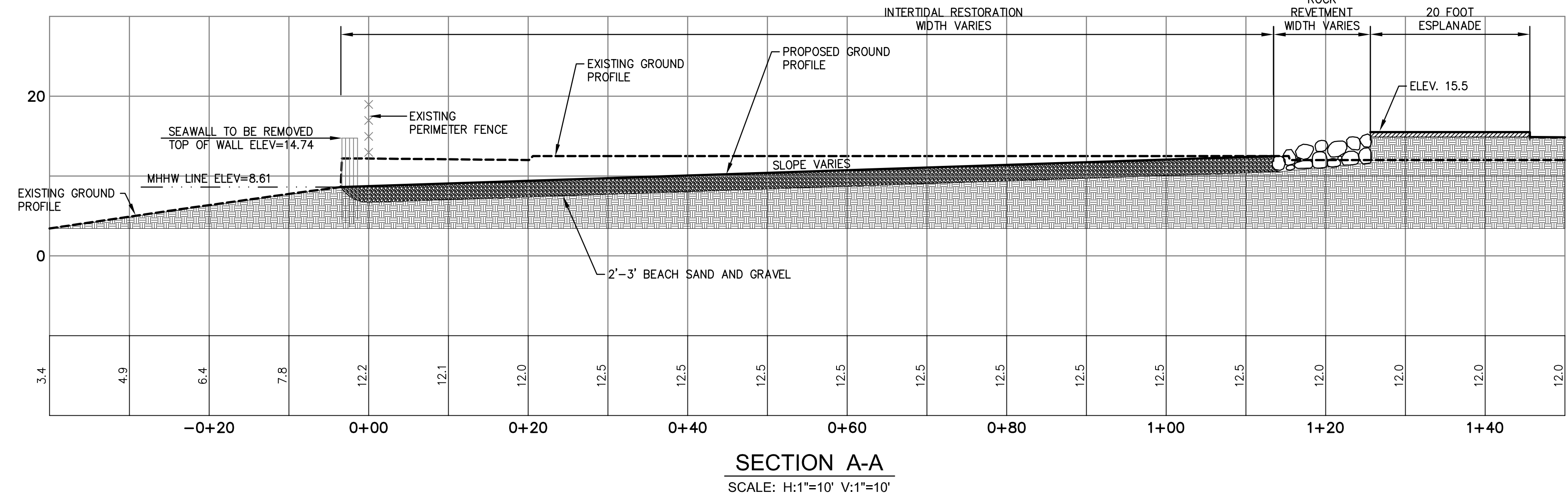
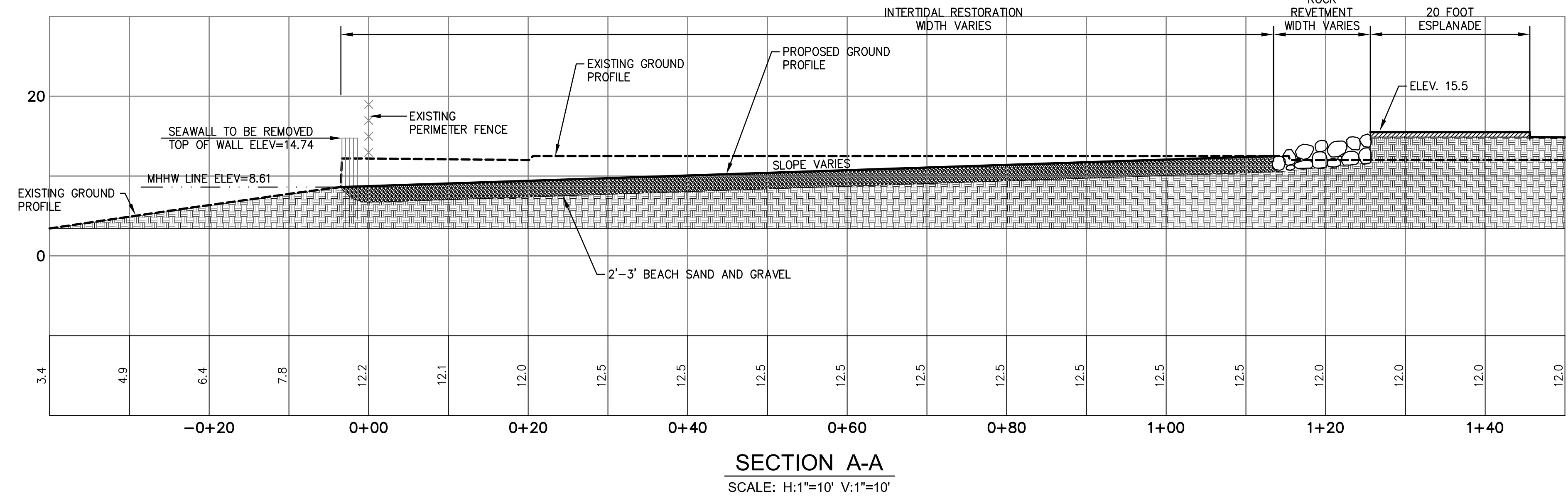
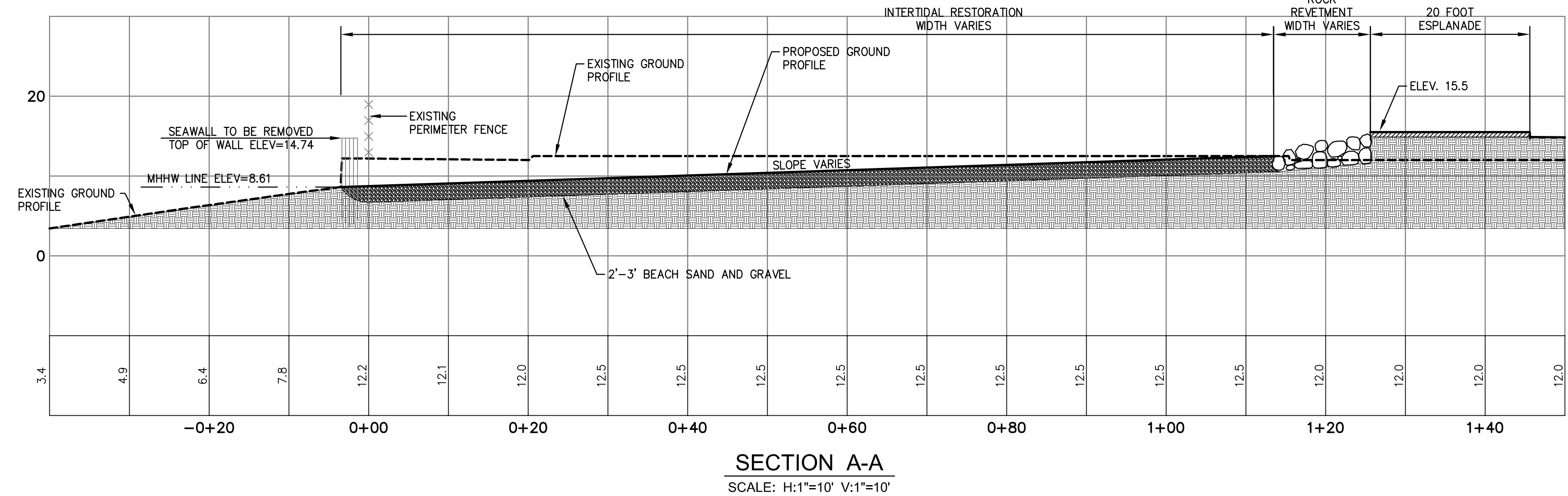
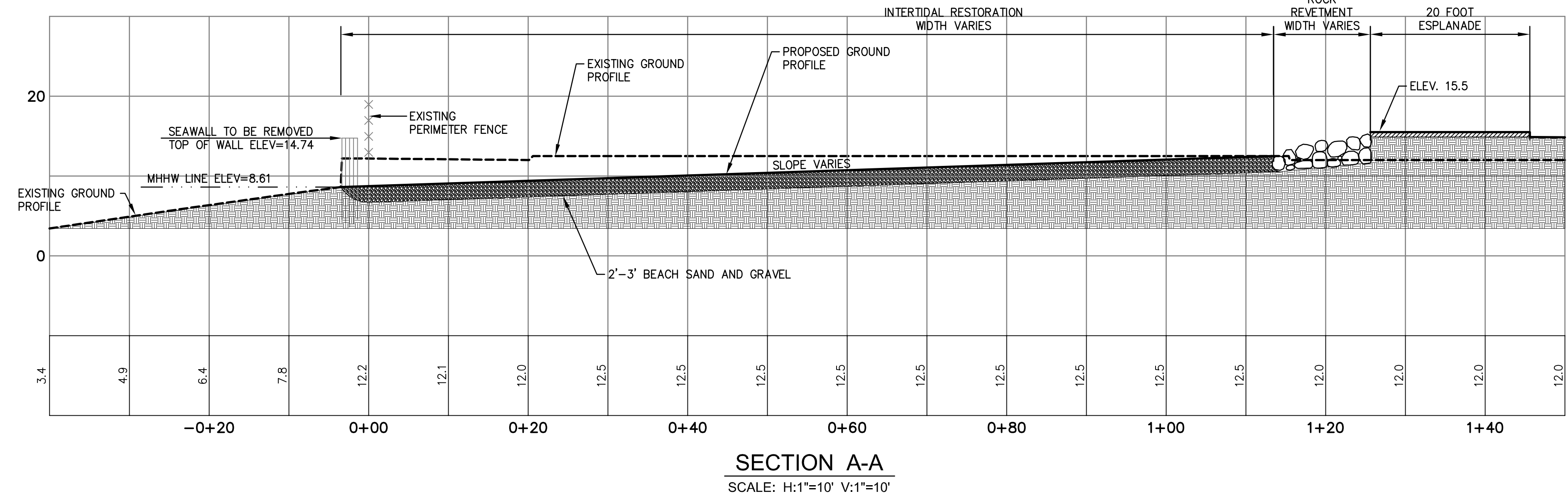
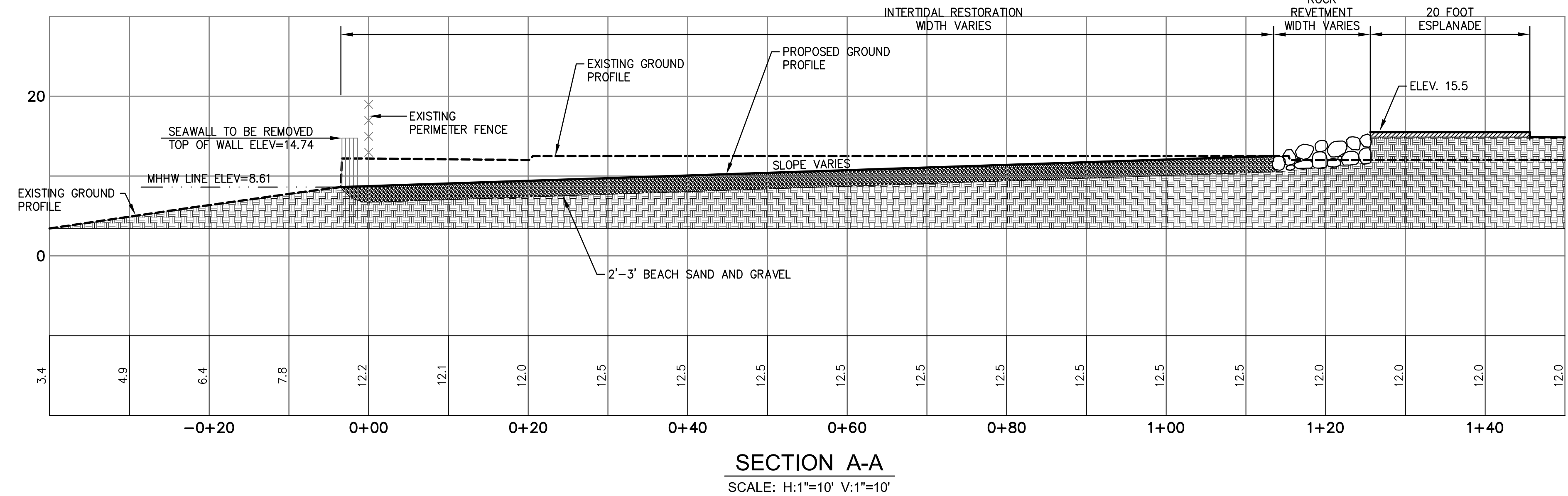
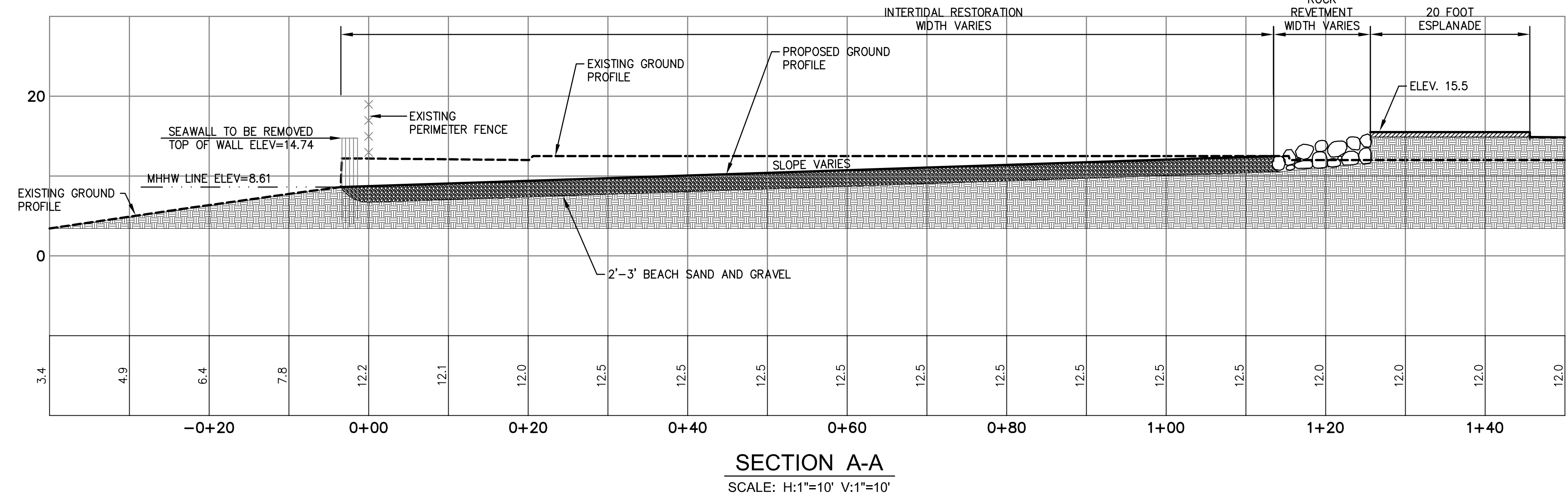
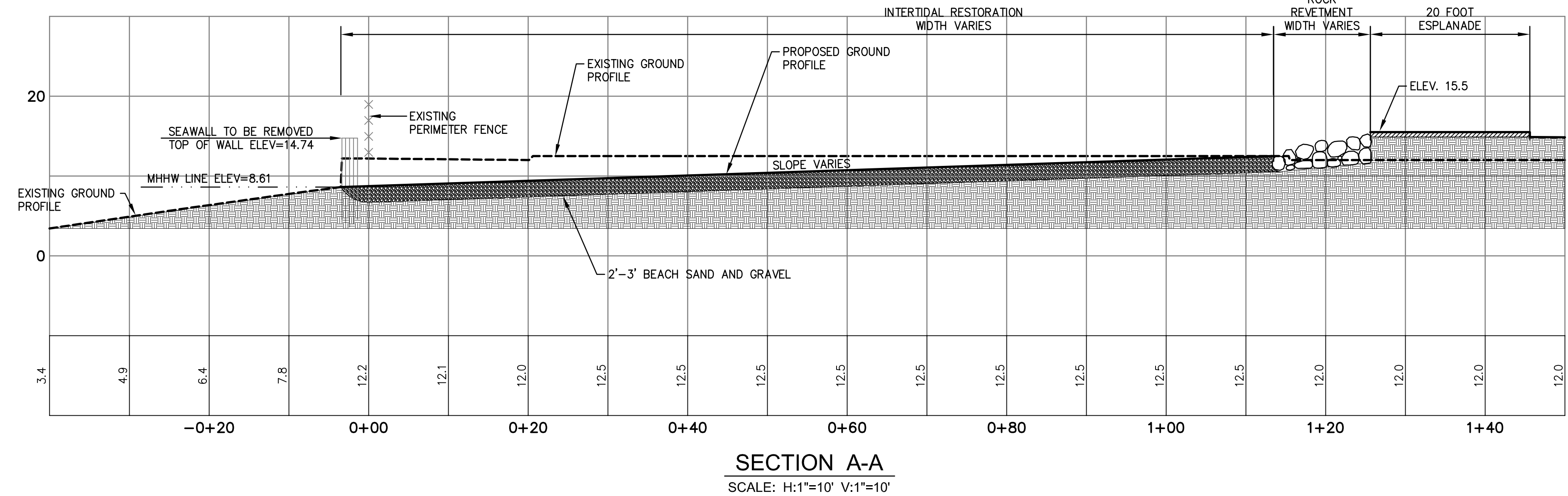
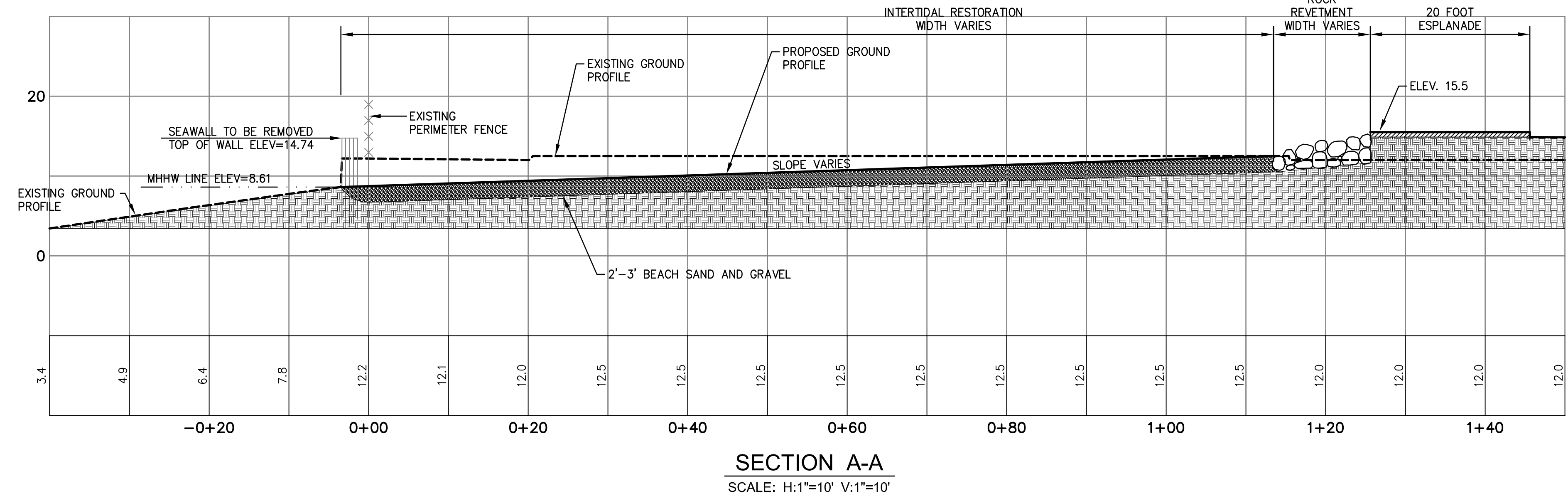
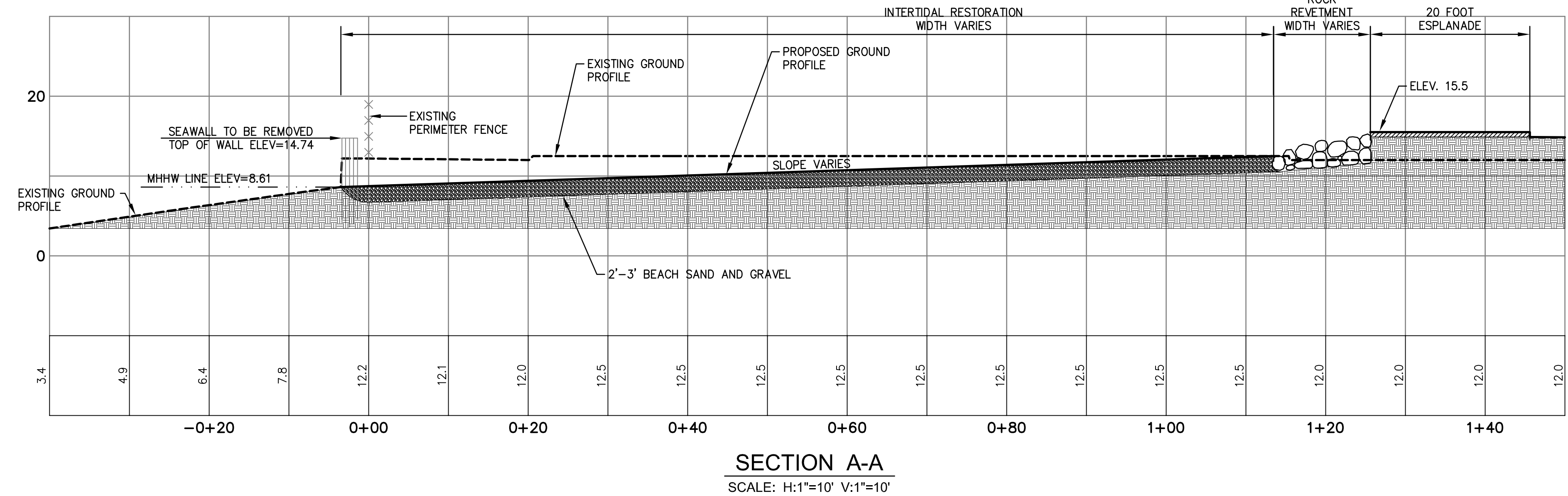
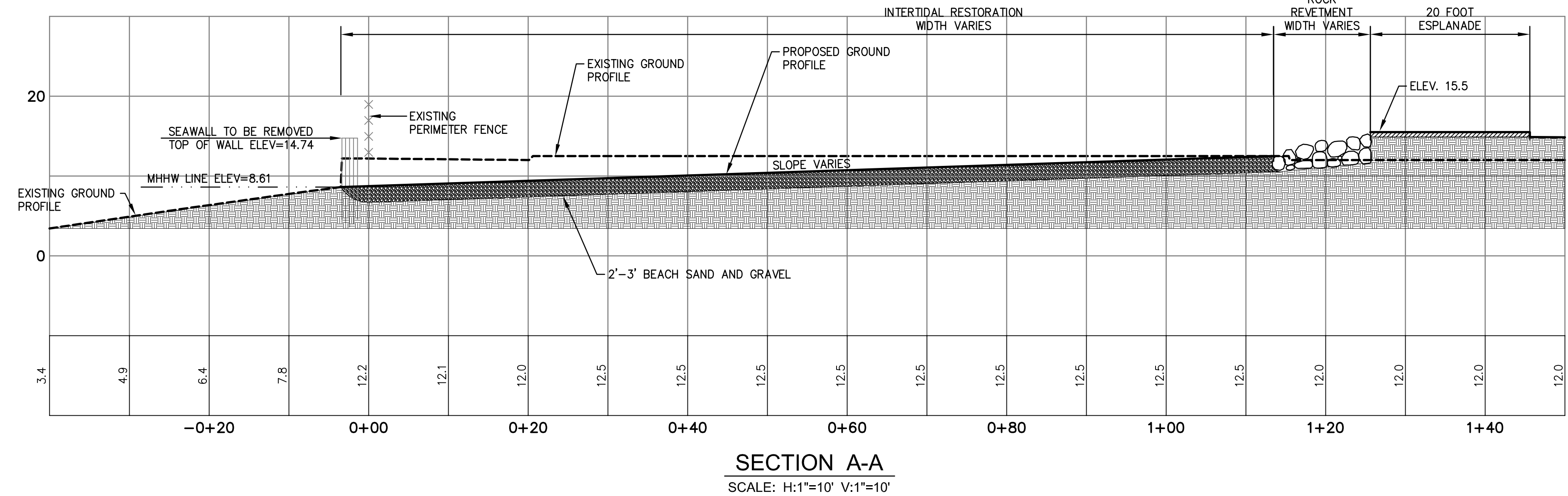
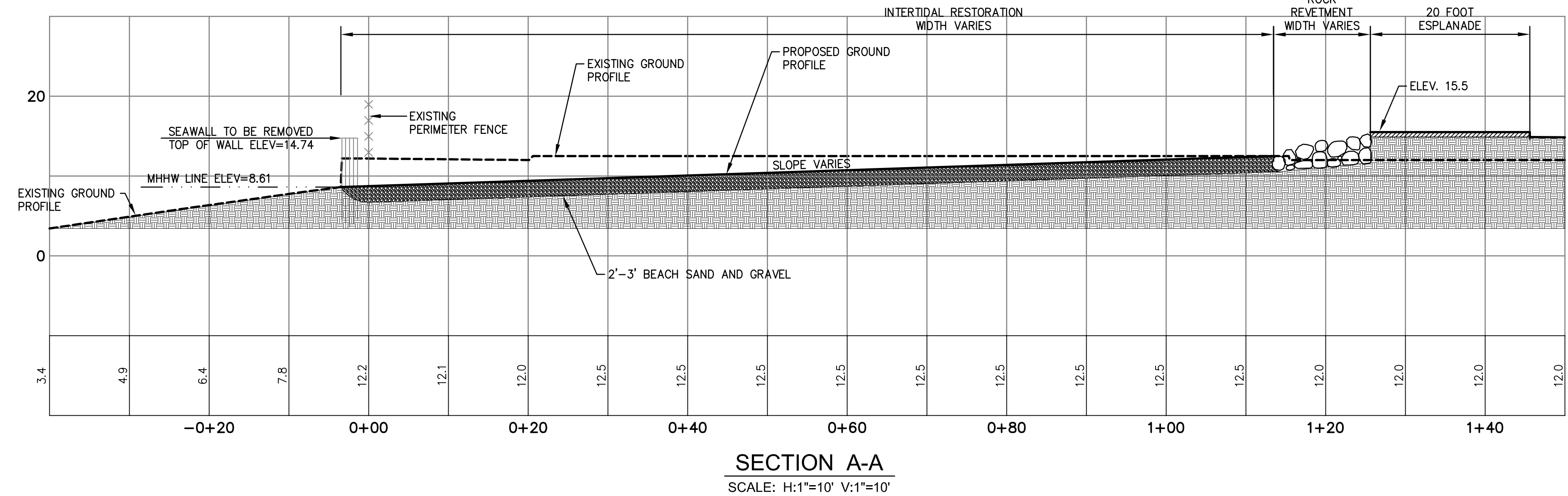
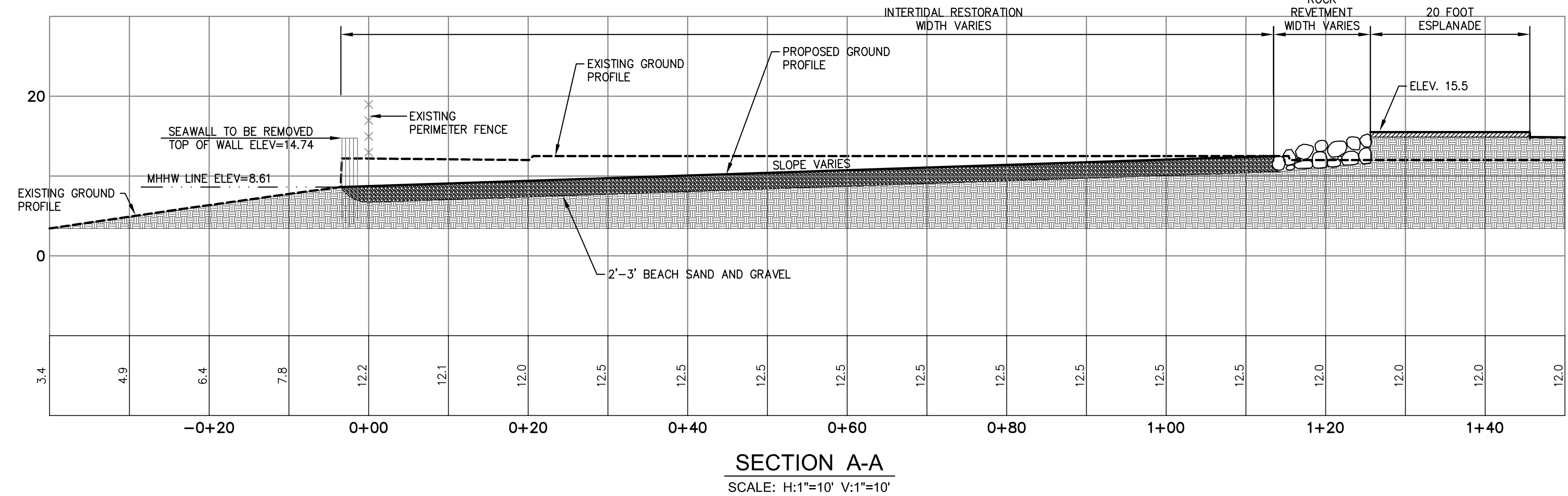
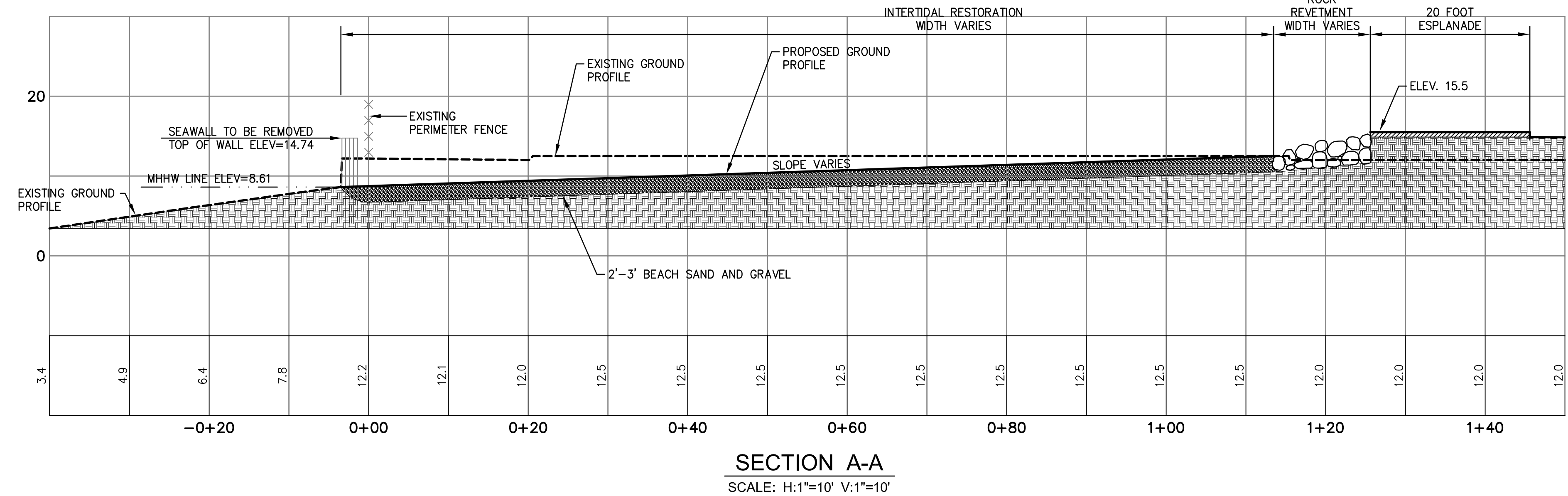
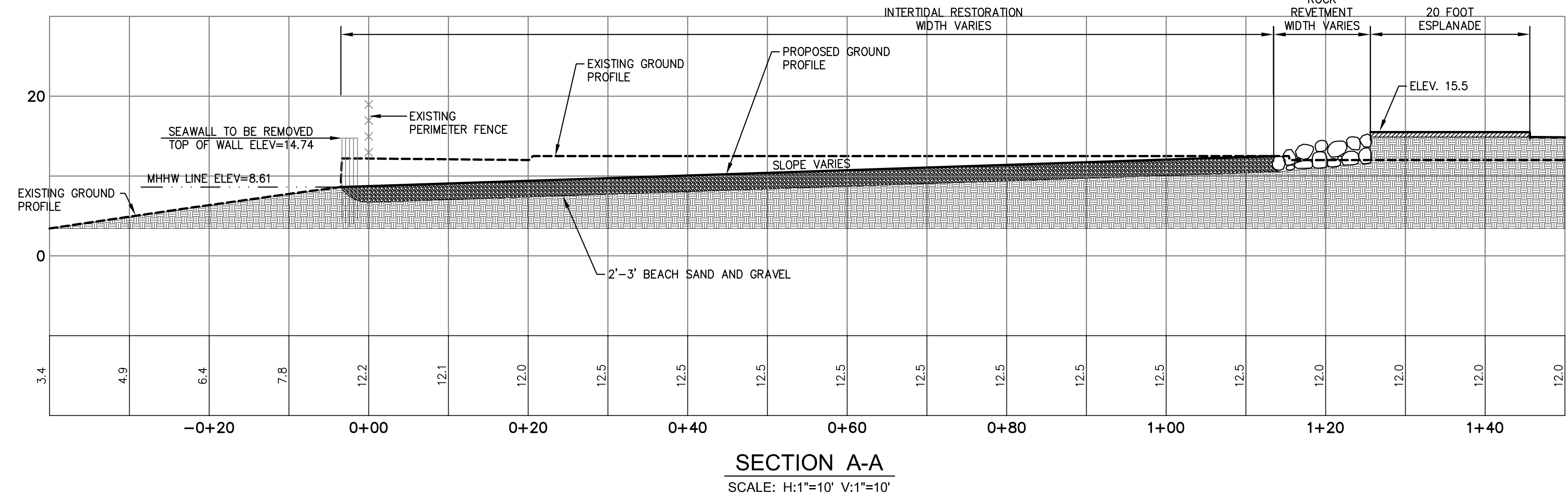
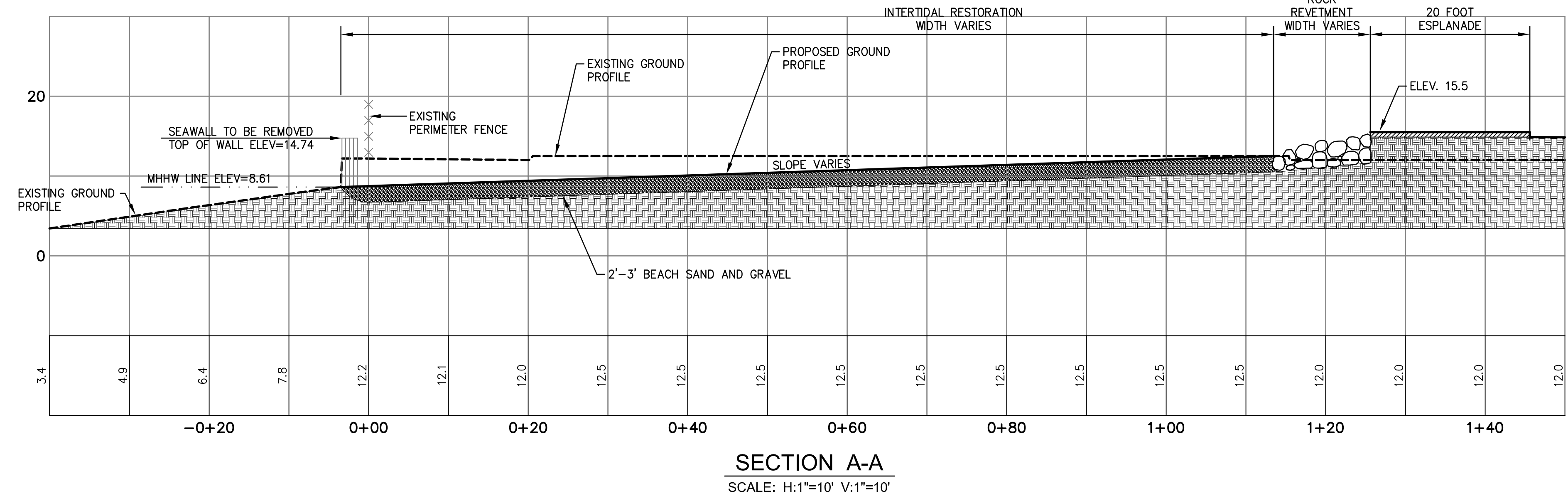
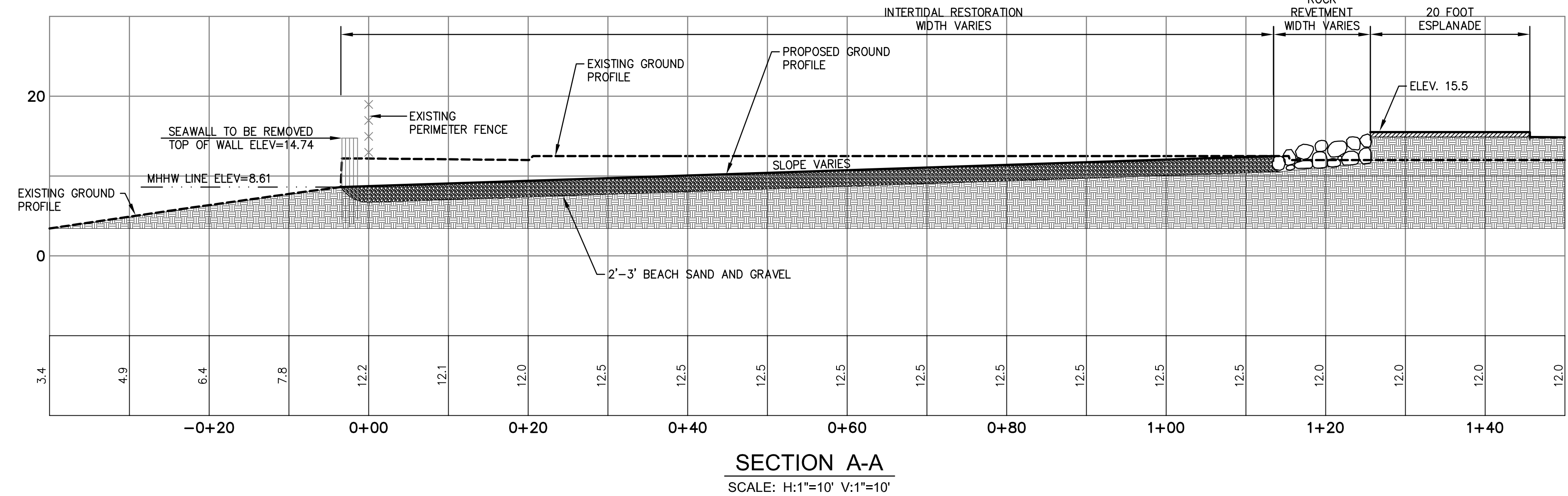
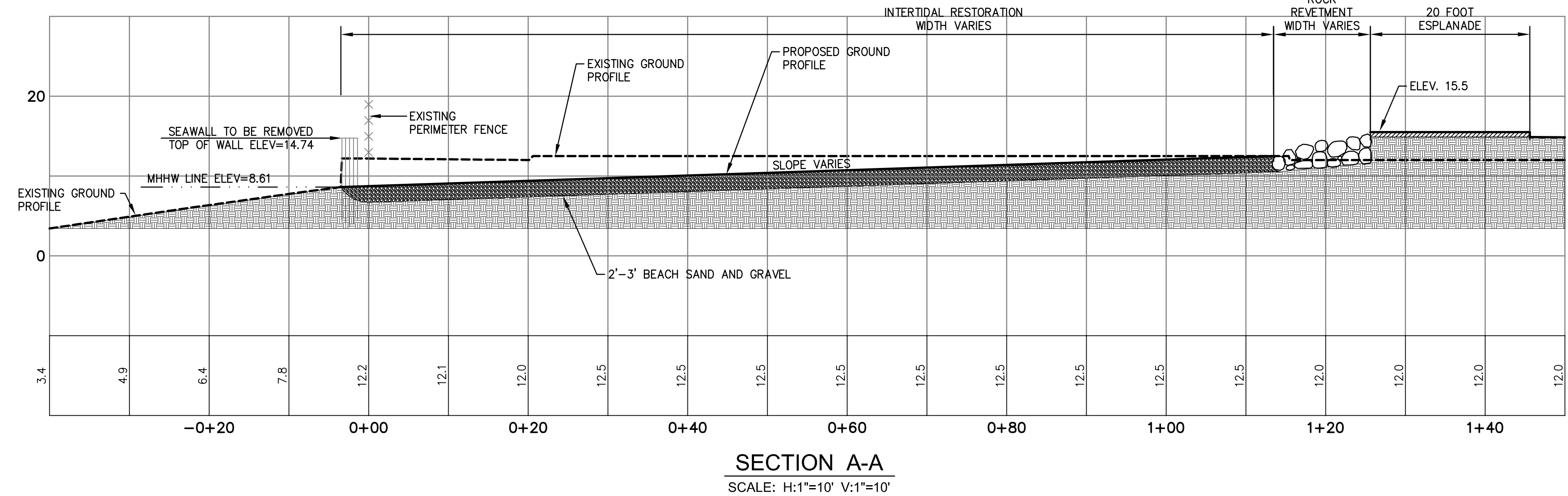
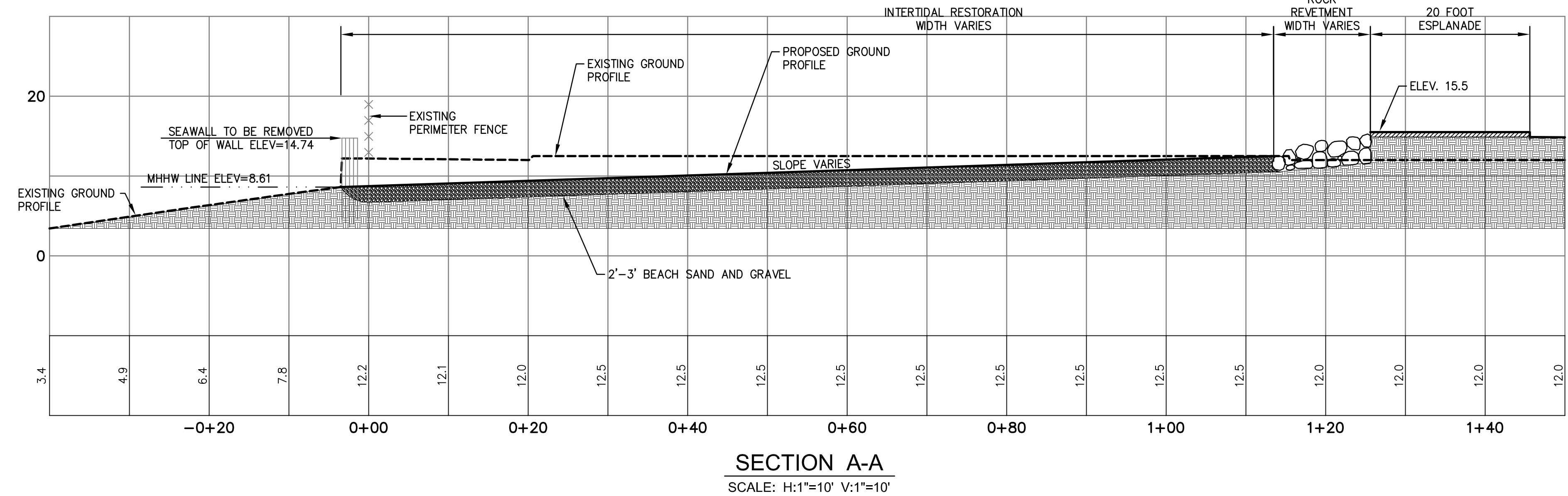
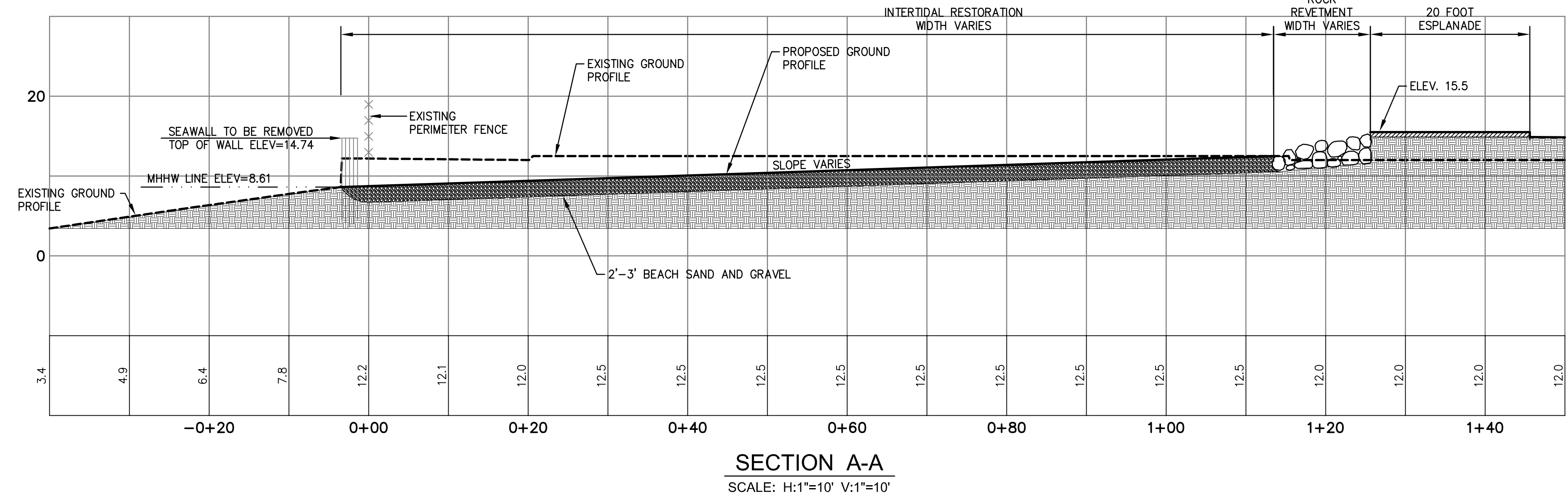
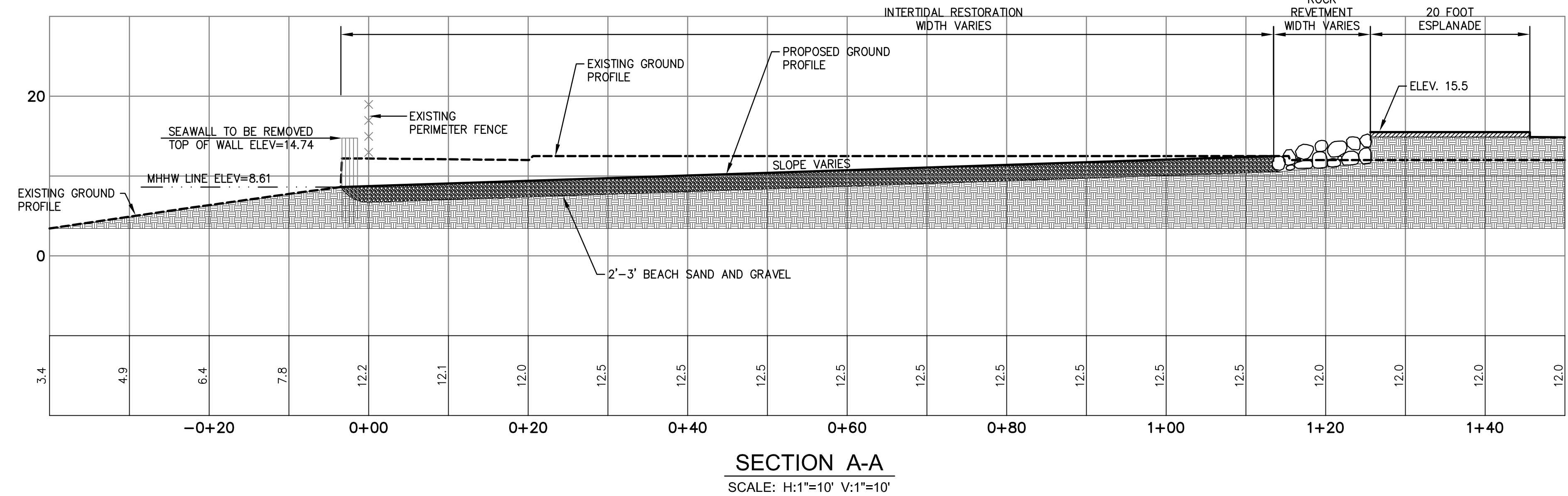
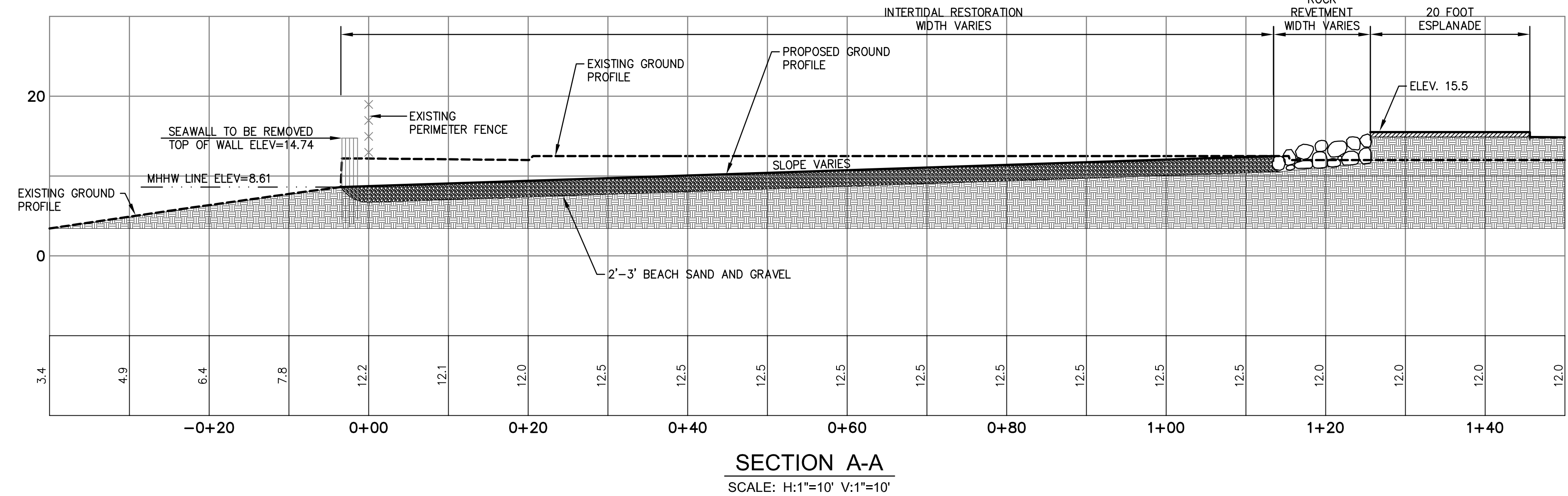
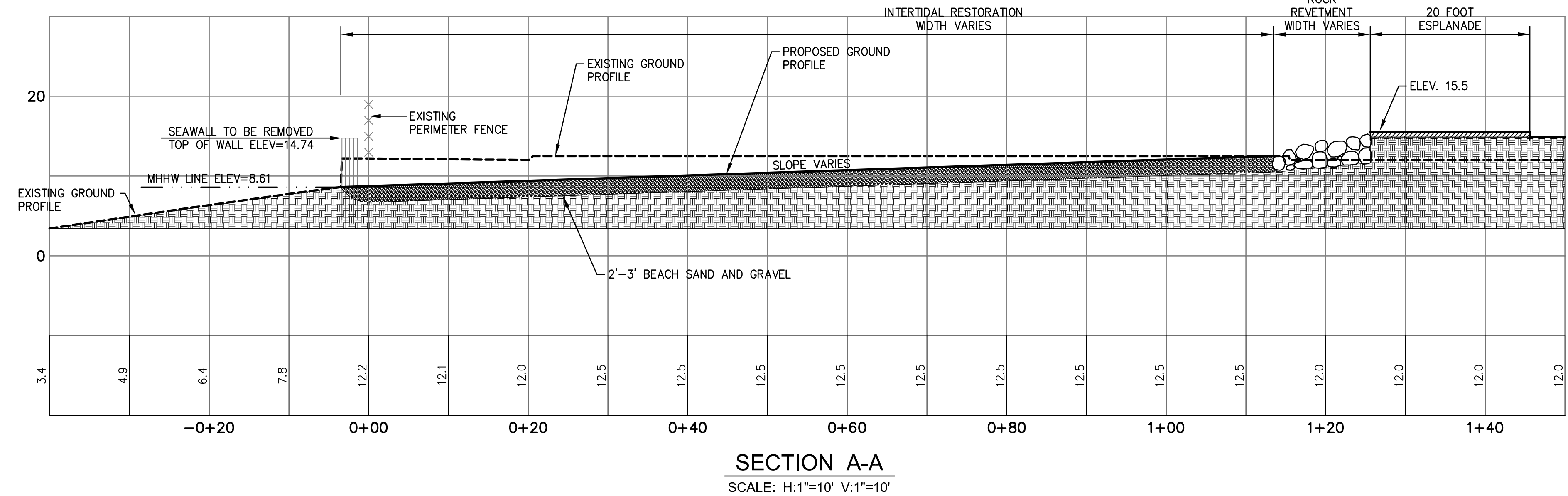
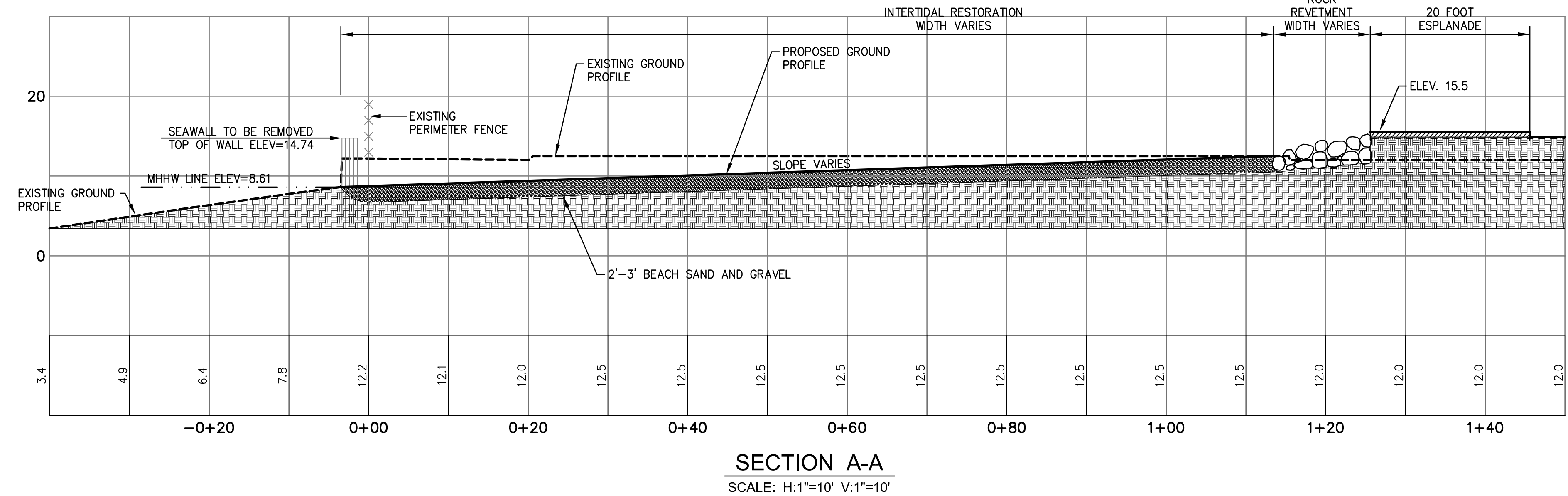
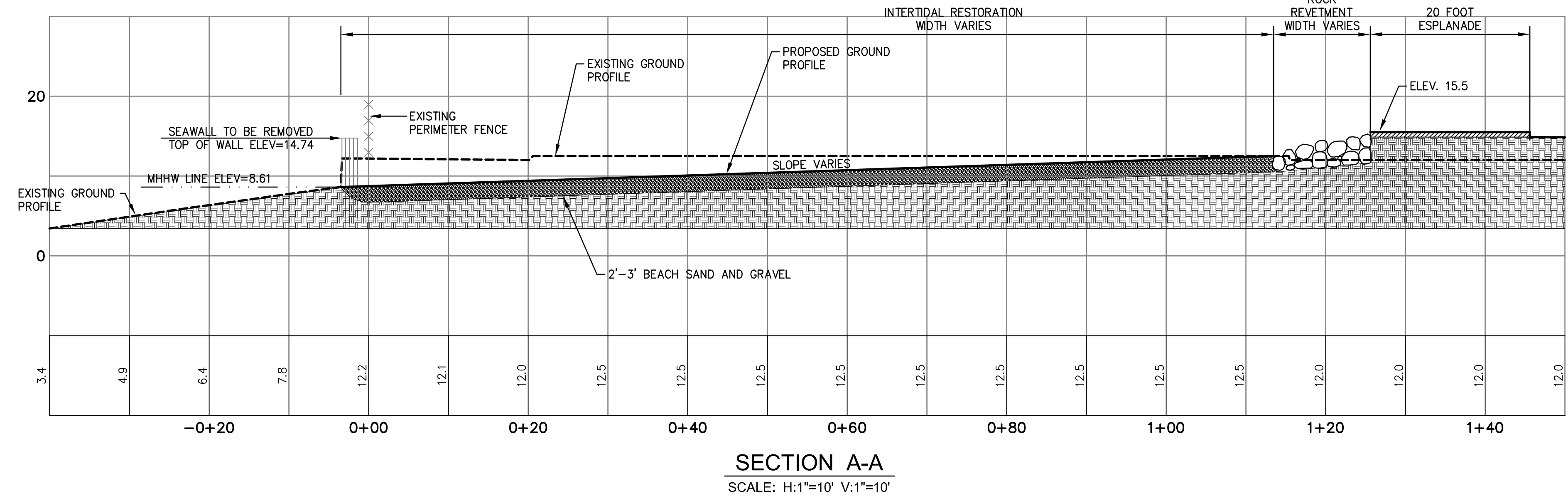
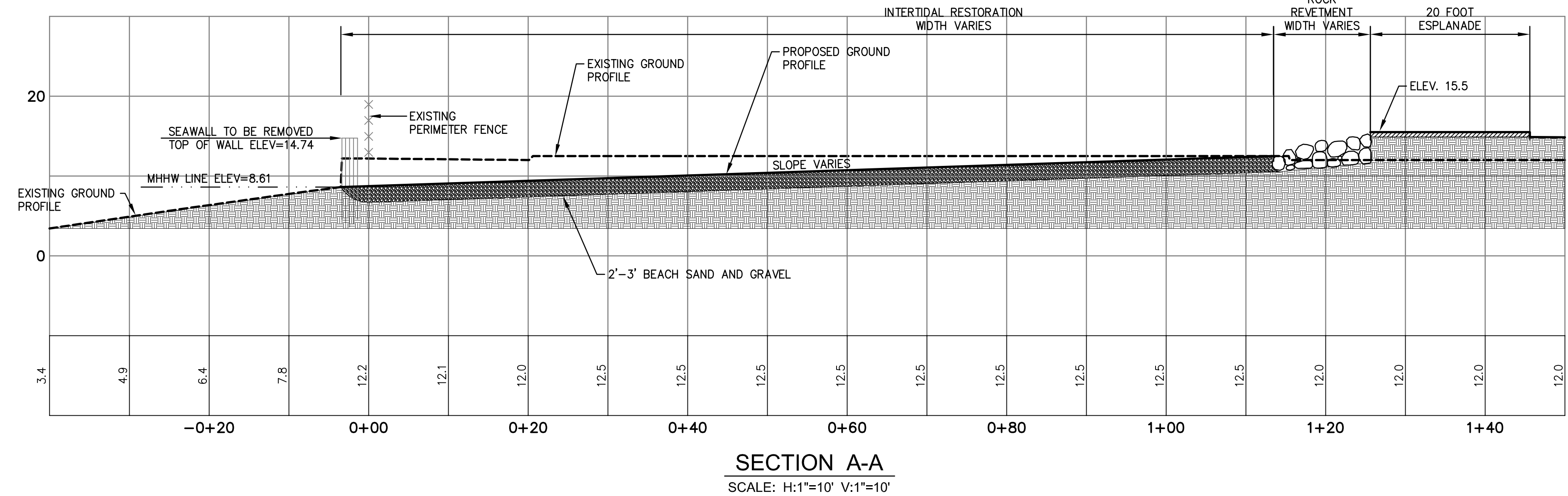
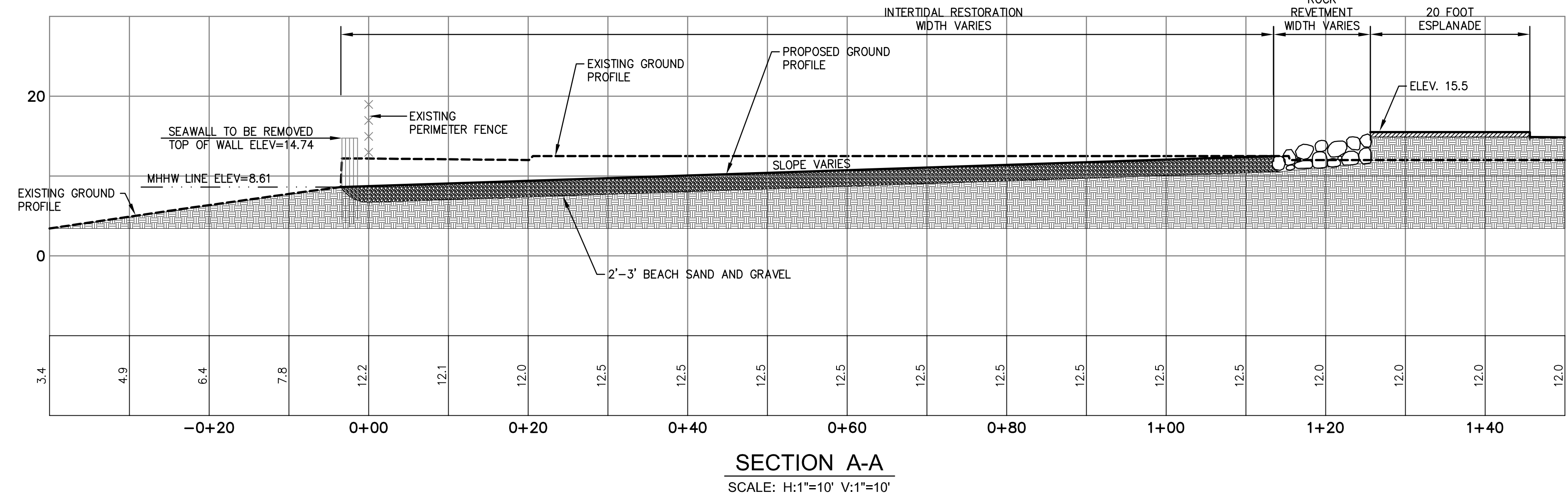
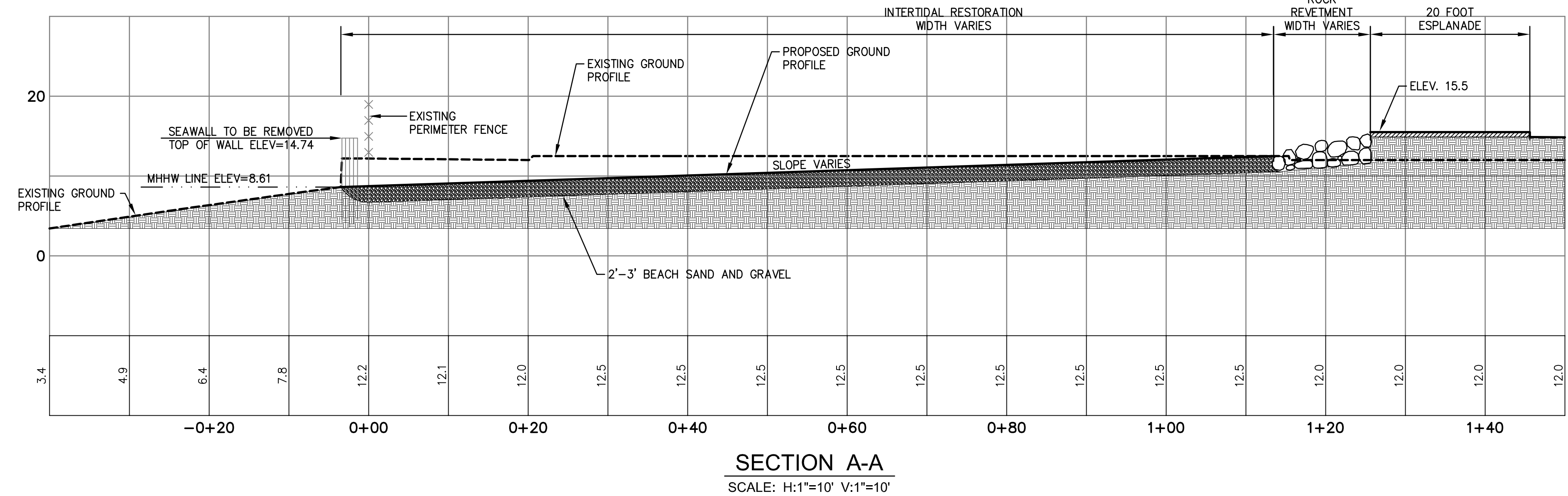
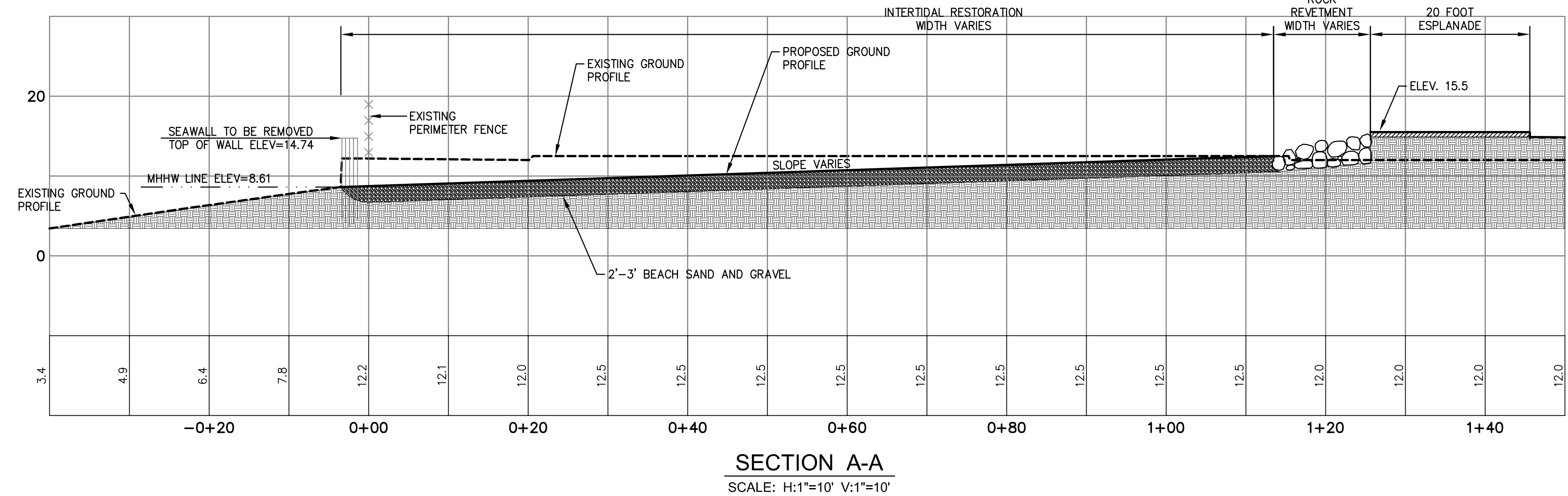
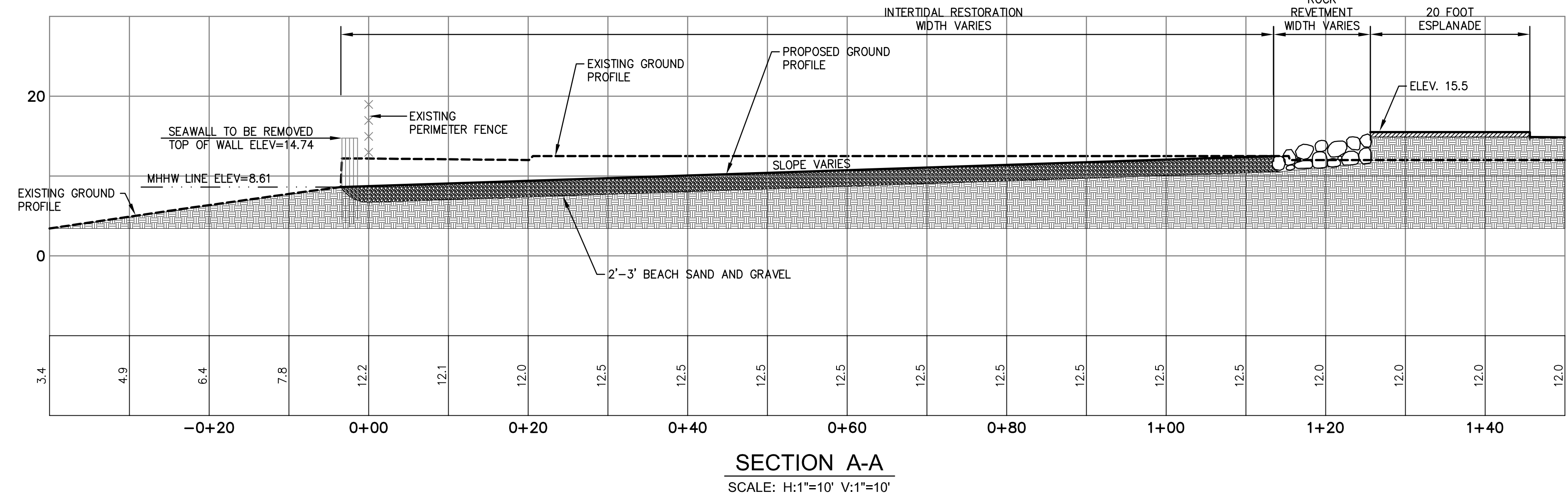
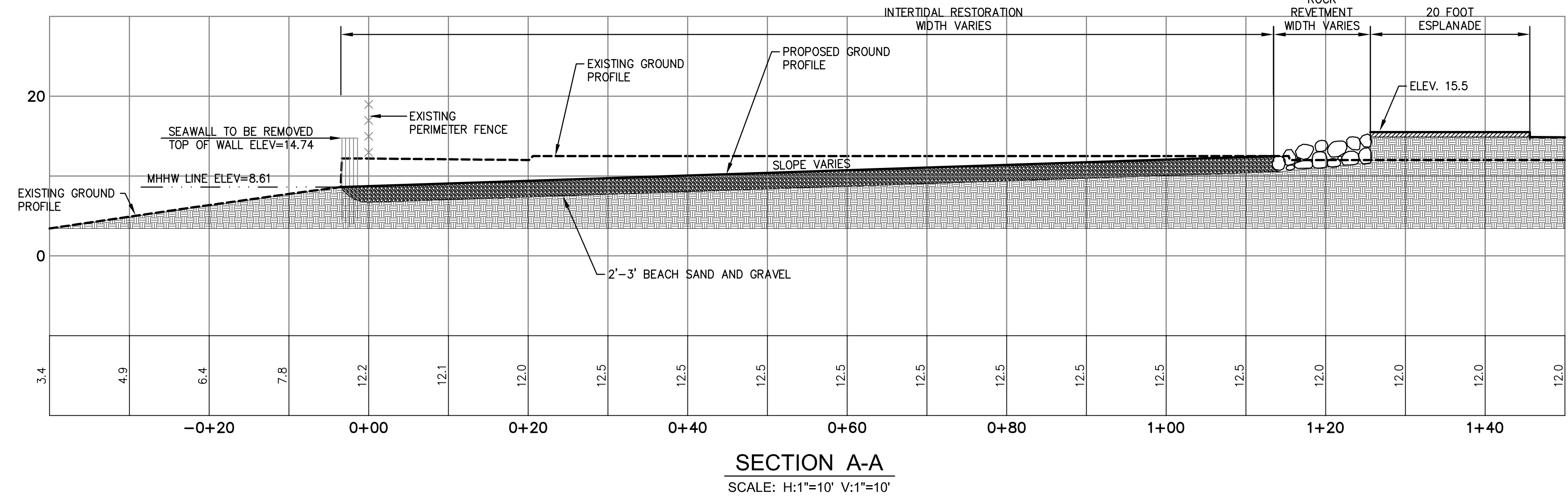
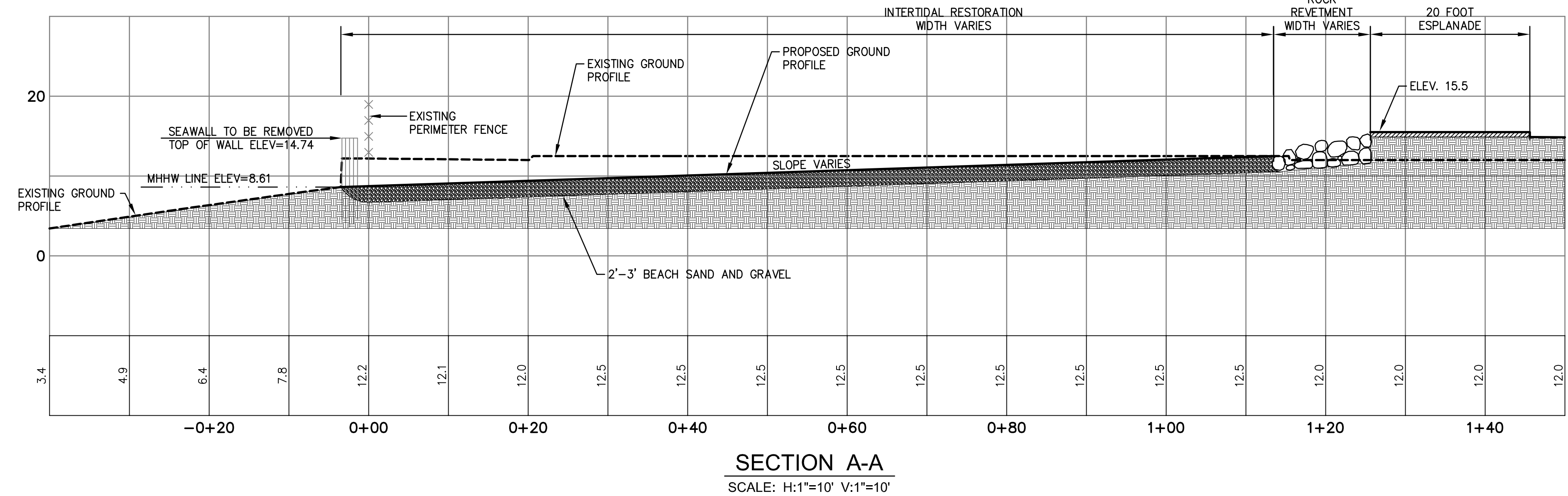
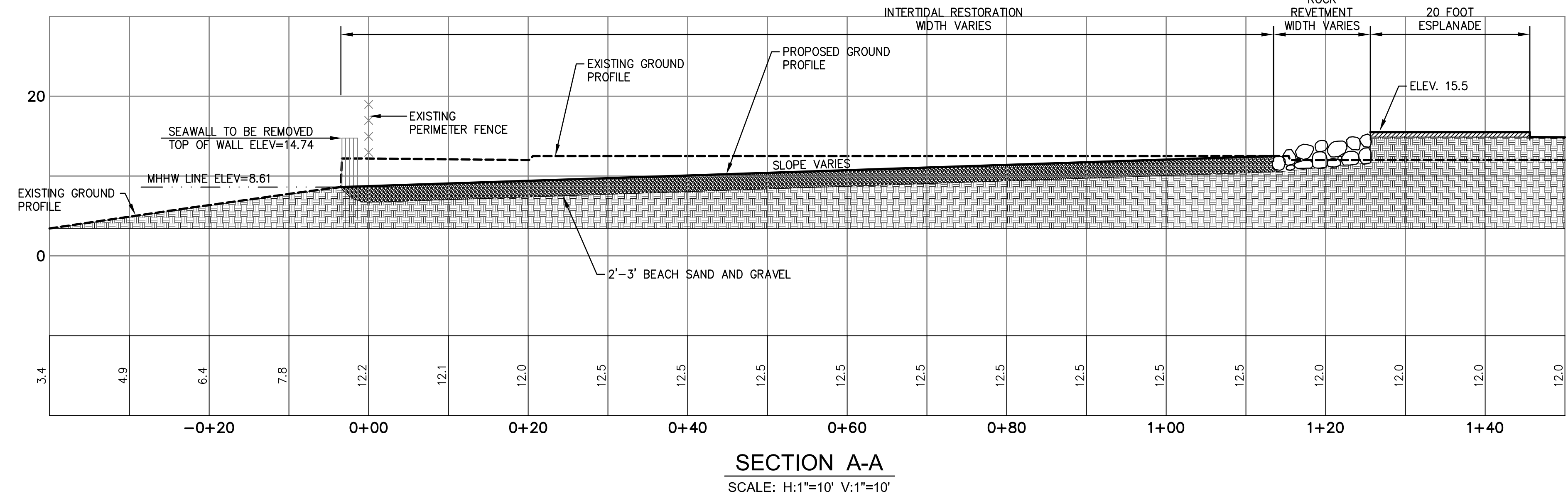
4. ALL PLANT MATERIALS SHALL BE IRRIGATED BY THE CONTRACTOR THOROUGHLY WHEN PLANTED AND THROUGHOUT THE PLANT ESTABLISHMENT PERIOD. ALL PLANTS SHALL RECEIVE AT LEAST ONE INCH OF WATER PER WEEK DURING THE FIRST GROWING SEASON (MARCH 15 TO OCTOBER 15) EXCLUDING SIGNIFICANT RAIN EVENTS.

PLANT SCHEDULE

(FOR RESTORATION PLAN SHEET RP-1)

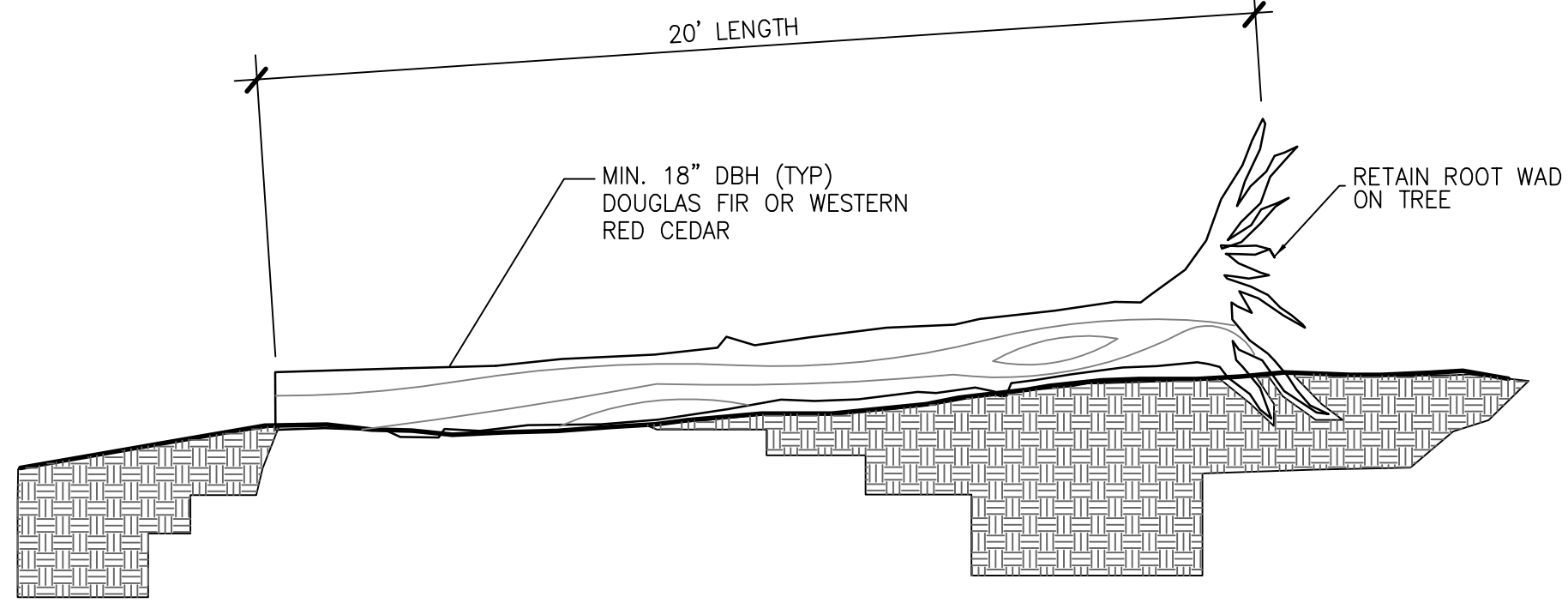
BOTANICAL NAME	COMMON NAME	CONDITION	SIZE	SPACING	QUANTITY	
					R-1	R-2
TREES						
THUJA PLICATA	WESTERN RED CEDAR	BB/5 GAL.	6' MIN. HT.	8' O.C.	182	104
PSEUDOTSUGA MENZIESII	DOUGLAS FIR	BB/5 GAL.	6' MIN. HT.	8' O.C.	364	207
TSUGA HETEROPHYLLA	WESTERN HEMLOCK	BB/5 GAL.	6' MIN. HT.	8' O.C.	182	104
SHRUBS *						
ACER CIRCINATUM	VINE MAPLE	2 GAL.	3' MIN. HT.	4' O.C.	182	104
INDIAN PLUM	OEMLERIA CERASIFORMIS	2 GAL.	3' MIN. HT.	4' O.C.	182	104
CORNUS SERICEA	RED OSIER DOGWOOD	2 GAL.	3' MIN. HT.	4' O.C.	364	207
LONICERA INVOLUCRATA	BLACK TWINBERRY	2 GAL.	3' MIN. HT.	4' O.C.	364	207
SYMPHORICARPOS ALBUS	SNOWBERRY	2 GAL.	2' MIN. HT.	4' O.C.	364	207
HOLODISCUS DISCOLOR	OCEAN SPRAY	2 GAL.	2' MIN. HT.	4' O.C.	364	207
ROSA NUTKANA	NOOTKA ROSE	2 GAL.	3' MIN. HT.	4' O.C.	728	414
MAHONIA AQUIFOLIUM	TALL OREGON GRAPE	2 GAL.	2' MIN. HT.	4' O.C.	364	207

* 1. SHRUBS SHALL BE PLANTED IN CLUSTERS OF 3-5 OF THE SAME SPECIES.



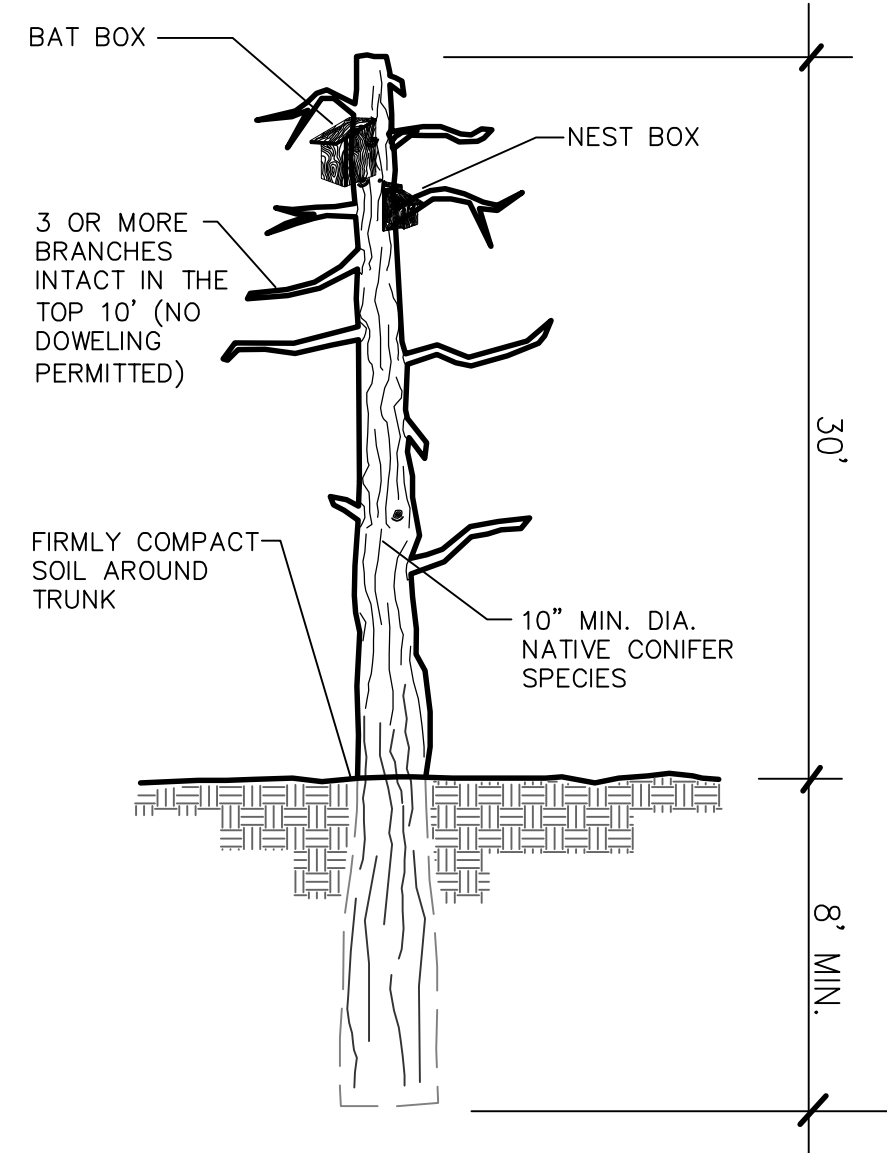
2"
1"
0 1/2"

SECTION 35, T 27 N, R 3E, W.M.



DOWNED LOG

NOT TO SCALE



STANDING SNAG DETAIL

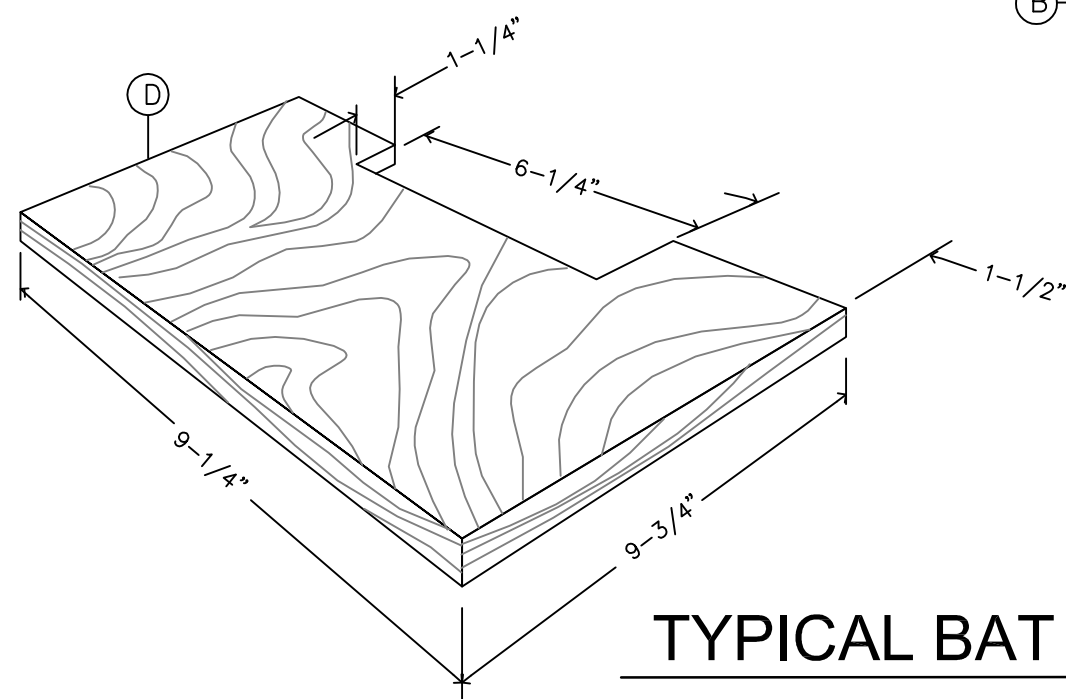
NOT TO SCALE

DIMENSIONS

- A— ROOF 16-1/2"x11-1/4"
- B— FRONT 18-1/4"x9-1/2"
- C— BACK 27"x9-1/4"
- D— CEILING 93/4"x9-1/4"
- E— PARTITIONS 9-1/4" WIDE x 8" HIGH
- F— PARTITIONS 9-1/4" WIDE x 14" HIGH
- G— SIDES 11-1/4" WIDE x 27" AT BACK, 18-3/4" FRONT

SPACING BETWEEN PARTITIONS

FRONT TO BACK 3/4", 3/4", 3/4", 1", 1-1/2", 1-1/4"



TYPICAL BAT BOX

NOT TO SCALE

NEST BOX SPECIFICATIONS

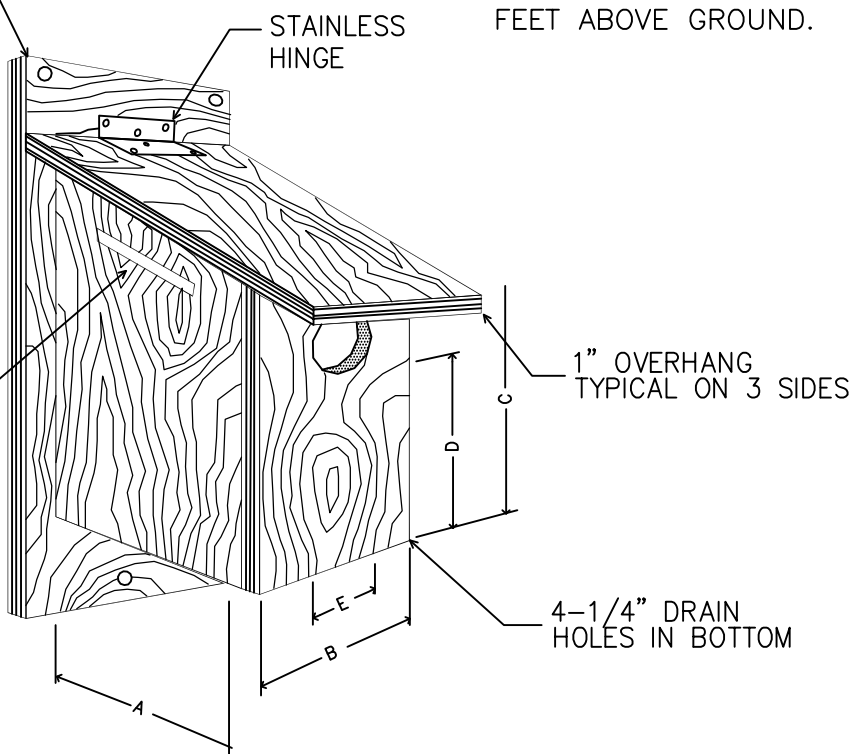
TARGET SPECIES	Floor of Cavity (inches) AxB	Depth of Cavity (inches) C	Entrance Above Floor (inches) D	Size of Entrance (inches) E
CHICKADEE NUTHATCH	4 x 4	8-10	6-8	1.25 DIA.

ATTACH WITH 3-1/4"x3" STAINLESS SCREWS (2 @ TOP IN CORNERS & 1 BOTTOM CENTER)

NOTE

1. MOUNT BAT BOX ON SNAG BETWEEN 25 AND 28 FEET ABOVE GROUND.

1/4"x4" NOTCH AT TOP OF SIDE FOR AIR VENTILATION

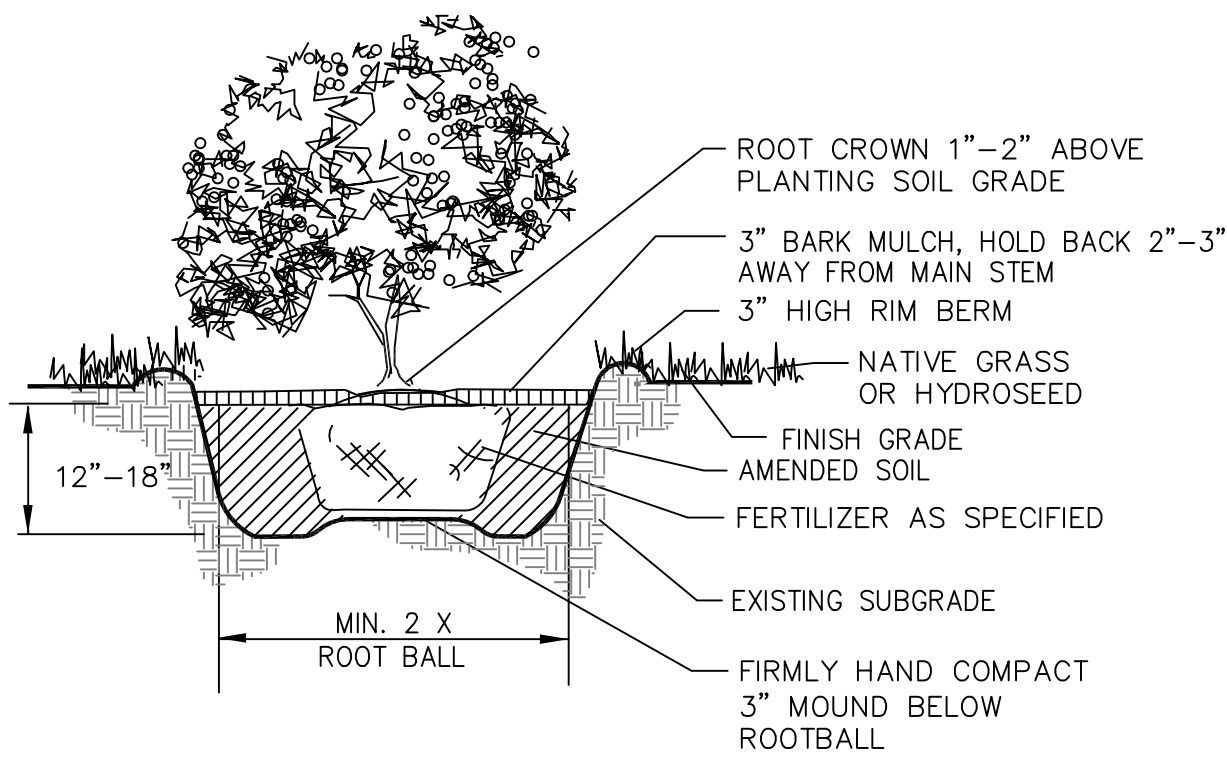


TYPICAL NEST BOX

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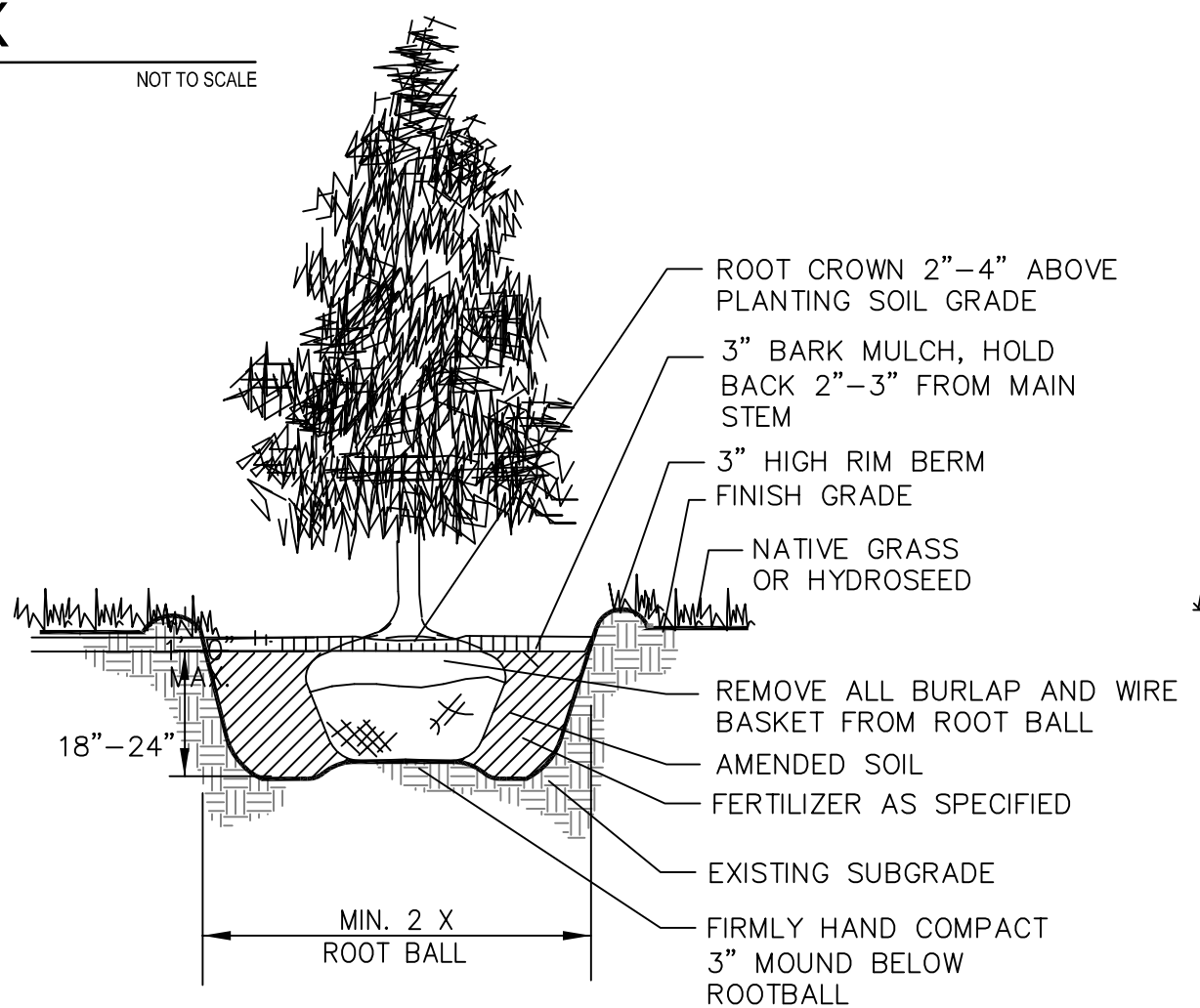
NOTE

1. MOUNT NEST BOX ON SNAG BETWEEN 25 AND 28 FEET ABOVE GROUND.



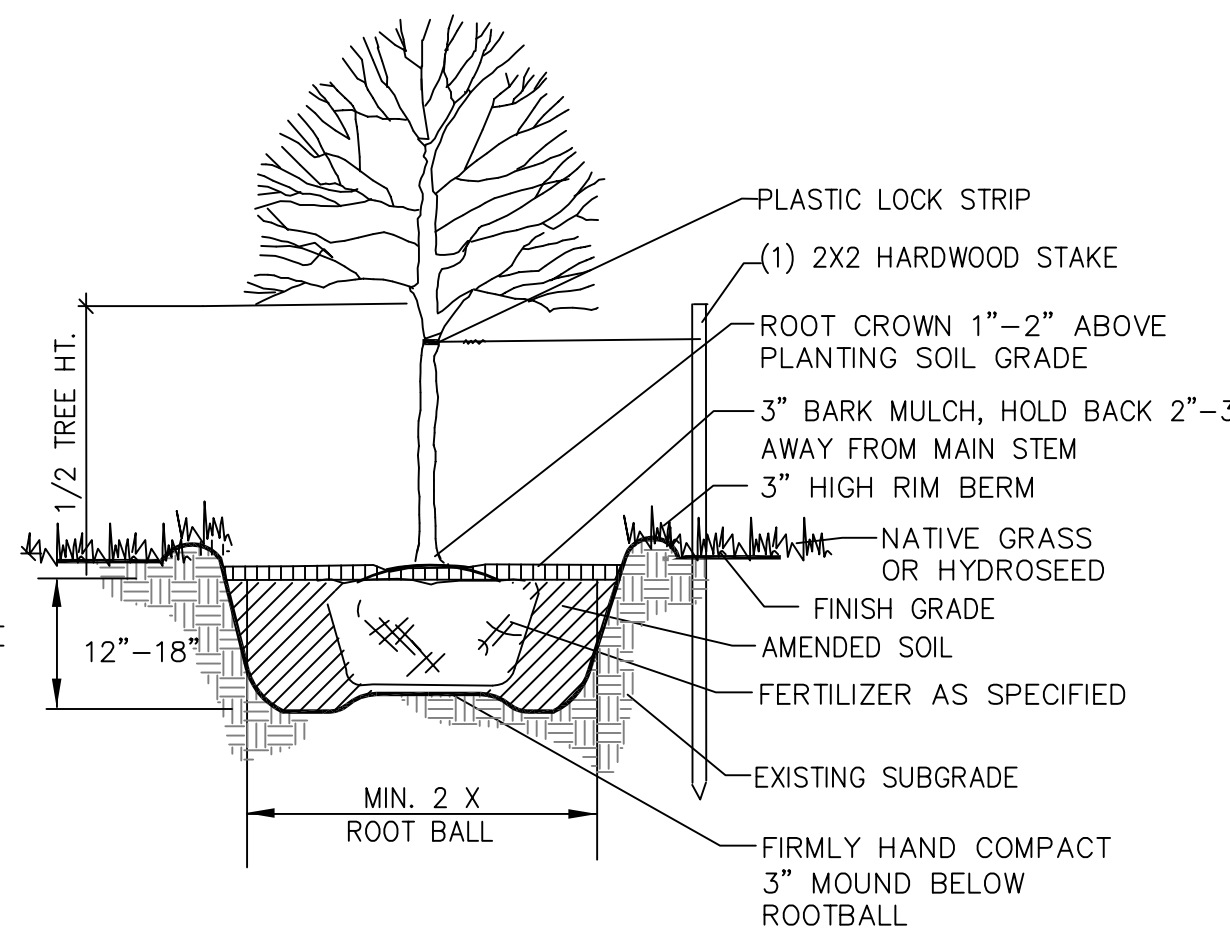
SHRUB PLANTING

NOT TO SCALE



EVERGREEN TREE PLANTING

NOT TO SCALE



DECIDUOUS TREE PLANTING

NOT TO SCALE

PFN

100% URBAN CENTER SUBMITTAL 03/04/2011

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+ WILL

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Seattle, WA 98101
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f: 206.441.4981
www.perkinswill.com

Point Wells
Development

BSRE
Point Wells, LP

c/o Karr Tuttle Campbell
1201 Third Avenue, Suite 2900
Seattle, Washington 98101

in association with:

ROLE

Company Name



DAVID EVANS
AND ASSOCIATES INC.

1620 W. Marine View Drive, Suite 200
Everett Washington 98201
Phone: 425.259.4099

Sheet Information

Date 03/04/2011
Job Number 169009.000
Drawn GBK
Checked JCGA
Approved SASW
Title

RESTORATION
DETAILS

Sheet

RP-3

PRELIMINARY DRAFT
NOT Issued for Construction

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1.0 RESTORATION PLAN OVERVIEW

1.1 PROJECT DESCRIPTION

THE PROJECT SITE IS LOCATED NORTH OF SEATTLE, WASHINGTON IN SOUTHWEST SNOHOMISH COUNTY, ALONG PUCET SOUND SHORELINE, AT POINT WELLS. THE POINT WELLS DEVELOPMENT PROJECT INVOLVES THE REDEVELOPMENT OF APPROXIMATELY 50 ACRES OF HEAVY INDUSTRIAL USE LAND INTO A MIXED USE FACILITY CONSISTING OF COMMERCIAL, RETAIL, RESIDENTIAL AND PUBLIC RECREATION OPPORTUNITIES.

THE PROJECT INCLUDES APPROXIMATELY 16 ACRES (AC) OF ADJOINING TIDELANDS THAT WILL REMAIN UNDEVELOPED EXCEPT FOR AN EXISTING DEEP WATER PIER, BOAT DOCK AND BOAT LAUNCH RAMP. THE CONSTRUCTION OF THE PROJECT WILL INCLUDE 5.61 AC OF INTERTIDAL RESTORATION AND 2.40 AC OF NATIVE NEARSHORE PLANTING.

1.2 INTERTIDAL RESTORATION

5.61 AC OF RESTORATION WILL INCLUDE THE REMOVAL OF EXISTING SEAWALLS, RIPRAP AND FILL MATERIAL AND RE-GRADING TO RESTORE THE INTERTIDAL ZONE BACK TO ELEVATIONS AND GRADIENTS CONSISTENT WITH UNDEVELOPED SHORELINE OUTSIDE THE PROJECT AREA. RESTORATION WILL ALSO INCLUDE THE IMPORT OF 2 TO 3-FEET OF NATIVE SAND AND GRAVEL COMPOSITION.

1.2 NEARSHORE PLANTING

2.40 AC OF NEARSHORE VEGETATION CONSISTING OF NATIVE TREES AND SHRUBS WILL BE PLANTED TO PROVIDE A DIVERSITY OF SPECIES AND WILDLIFE HABITAT.

2.0 RESTORATION GOALS AND OBJECTIVES

GOALS

RESTORE LOST FUNCTIONS TO INTERTIDAL ZONE.

RESTORE LOST FUNCTIONS TO NEARSHORE HABITAT.

OBJECTIVES

1. REGRADE 5.61 AC OF INTERTIDAL ZONE TO NATURAL ELEVATIONS AND GRADIENTS.
2. RESTORE 5.61 AC OF INTERTIDAL ZONE TO A NATIVE SAND AND GRAVEL COMPOSITION.
3. PROVIDE 2.40 AC NEARSHORE ZONE NATIVE PLANTINGS.

3.0 PERFORMANCE STANDARDS

PERFORMANCE STANDARDS HAVE BEEN ESTABLISHED THAT CORRESPOND TO THE STATED RESTORATION GOALS AND OBJECTIVES. THESE STANDARDS ARE THE PRIMARY FACTORS THAT SHALL BE USED TO JUDGE THE SUCCESS OF THE RESTORATION PROJECT. IT SHALL BE EXCEEDINGLY IMPORTANT TO EVALUATE THE DEVELOPMENT OF THE RESTORATION PLAN OVER THE ENTIRE MONITORING PERIOD WHEN DETERMINING WHETHER EACH INDIVIDUAL STANDARD HAS BEEN MET OR NOT. WHILE SPECIFIC PERFORMANCE CRITERIA PROVIDE IMPORTANT BENCHMARKS AND SHALL HELP TO DIRECT MAINTENANCE AND CONTINGENCY EFFORTS, THE SUCCESS OF RESTORATION MUST BE MEASURED AGAINST THE GOALS AND OBJECTIVES OF THE OVERALL RESTORATION PLAN. BY MONITORING THE PROJECT AND COMPARING MONITORING RESULTS TO PERFORMANCE STANDARDS, A DETERMINATION CAN BE MADE FOR THE NEED TO IMPLEMENT MAINTENANCE EFFORTS OR THE CONTINGENCY PLAN. PERFORMANCE STANDARDS ARE IDENTIFIED IN THE TABLE BELOW.

4.0 MONITORING PLAN

RESTORATION MONITORING SHALL BE CONDUCTED BY A BIOLOGIST FOR FIVE (5) YEARS WHICH INCLUDES THE INSTALLATION INSPECTION (ONE YEAR WARRANTY INSPECTION). THE OBJECTIVE OF THE MONITORING PROGRAM SHALL BE TO ASSESS THE ESTABLISHMENT OF THE RESTORATION AREAS. ANNUAL REPORTS DESCRIBING MONITORING RESULTS SHALL BE SUBMITTED TO SNOHOMISH COUNTY BY DECEMBER 31 OF YEARS 1 THROUGH 5. THE MONITORING RESULTS SHALL BE RELATED TO THE PERFORMANCE STANDARDS AND IF WARRANTED, RECOMMENDATIONS SHALL BE MADE BASED ON THESE FINDINGS.

4.1 ESTABLISHMENT OF SENSITIVE (RESTORATION) AREAS

ENCROACHMENT INTO SENSITIVE AREAS SHALL BE MONITORED DURING EACH VISIT. THE SENSITIVE AREAS SHALL BE INSPECTED FOR CLEARING, TRASH DUMPING AND OTHER UNAUTHORIZED DISTURBANCES. ANY ENCROACHMENTS IN THE SENSITIVE AREAS SHALL BE NOTED AND DIRECTED TO THE ATTENTION OF ENVIRONMENTAL CONSTRUCTION MONITOR AND THE COUNTY.

4.2 VEGETATION ESTABLISHMENT

ALL PLANTINGS SHALL BE MONITORED FOR 5 YEARS AND SHALL INCLUDE REPRESENTATIVE SAMPLING FOR COVER, USING THE LINE-INTERCEPT METHOD ALONG TRANSECTS. OVERVIEW PHOTOGRAPHS SHALL BE TAKEN FROM CONSISTENT PHOTOPOINTS. ALL PLANTED TREES AND SHRUBS AND HERBACEOUS SPECIES, SHALL BE EVALUATED IN YEARS 1, 2, 3, 4, AND 5 TO DOCUMENT VEGETATION DEVELOPMENT. THE INITIAL MONITORING SHALL BE A COMPLETE CENSUS OF PLANTINGS AND SHALL OCCUR 1 YEAR AFTER INSTALLATION IN ORDER TO IMPLEMENT THE ONE YEAR WARRANTY TO BE PROVIDED BY THE LANDSCAPE CONTRACTOR.

4.3 RESTORATION MAINTENANCE

IF NECESSARY, MAINTENANCE ACTIONS SHALL BE RECOMMENDED BY THE BIOLOGIST. MAINTENANCE WITHIN THE RESTORATION AREAS SHALL BE THE RESPONSIBILITY OF THE OWNER DURING THE ONE YEAR WARRANTY PERIOD. FOLLOWING THE ONE YEAR WARRANTY PERIOD, MAINTENANCE SHALL BE PERFORMED AS NECESSARY TO ENSURE RESTORATION GOALS AND OBJECTIVES ARE MET. IMPLEMENTATION OF MAINTENANCE ACTIONS IS THE RESPONSIBILITY OF THE OWNER (PARAMOUNT PETROLEUM).

5.0 RESTORATION SEQUENCING

CONSTRUCTION OF THE RESTORATION AREAS SHALL GENERALLY INCLUDE:

1. A PRE-CONSTRUCTION MEETING;
2. MARKING LIMIT OF WORK FOR RESTORATION BOUNDARIES;
3. REMOVAL OF INVASIVE SPECIES AND INSTALLATION OF PLANTS AS SPECIFIED;
4. POST-CONSTRUCTION MEETING BETWEEN ALL INVOLVED PARTIES;
5. REMOVAL OF LIMIT OF WORK DEMARICATIONS;
6. IMPLEMENTATION OF MONITORING PROGRAM;
7. ON-GOING MAINTENANCE AS NECESSARY.

5.1 PRE-CONSTRUCTION MEETING

A PRE-CONSTRUCTION MEETING SHALL BE HELD ON-SITE BETWEEN THE PROJECT ENGINEER, ALL NECESSARY CONSTRUCTION CONTRACTORS (GENERAL AND LANDSCAPE CONTRACTORS), AND ENVIRONMENTAL CONSTRUCTION MONITOR. DURING THIS MEETING, SITE CONDITIONS, PERMIT, SPECIFICATIONS, AND THE RESTORATION PLANS SHALL BE REVIEWED. THIS SHALL ASSIST ALL INVOLVED PARTIES IN UNDERSTANDING THE INTENT, SPECIFICATIONS, AND REQUIREMENTS OF THE RESTORATION PLAN.

5.2 MARKING OF CONSTRUCTION LIMITS FOR RESTORATION AREA BOUNDARIES

THE LIMIT OF WORK BOUNDARIES OF THE RESTORATION AREAS SHALL BE MARKED IN THE FIELD PRIOR TO PRELIMINARY SITE PREPARATION, EARTHWORK, OR PLANTING BY THE CONTRACTOR. BOUNDARIES SHALL BE MARKED BY INSTALLING ORANGE TEMPORARY CONSTRUCTION FENCING TO CLEARLY DELINEATE THE RESTORATION AREAS.

5.3 POST-CONSTRUCTION MEETING

A POST-CONSTRUCTION SITE REVIEW OF THE COMPLETED WORK SHALL BE CONDUCTED BETWEEN THE ENVIRONMENTAL CONSTRUCTION MONITOR AND THE CONTRACTOR TO VERIFY THAT THE PLAN WAS PROPERLY IMPLEMENTED. THIS FIELD MEETING SHALL IDENTIFY ANY DISCREPANCIES BETWEEN THE PLAN AND THE FIELD PLANTINGS AND IF NECESSARY, PROPOSE CORRECTIVE MEASURES. IF THE PLAN WAS PROPERLY IMPLEMENTED, THE MONITORING PERIOD SHALL COMMENCE.

6.0 CONSTRUCTION OBSERVATION

THE ENVIRONMENTAL CONSTRUCTION MONITOR SHALL BE ON-SITE PERIODICALLY DURING THE IMPLEMENTATION OF THE RESTORATION AREA TO REVIEW THE PLANT INSTALLATION. THE RESPONSIBILITIES OF THE ENVIRONMENTAL CONSTRUCTION OBSERVER(S) SHALL INCLUDE: RESPONDING TO CONTRACTOR QUESTIONS REGARDING UNIQUE CONSTRUCTION OR PLANTING TECHNIQUES; REVIEW OF CONSTRUCTION MATERIALS AND NURSERY STOCK, AND REVIEW OF PLANT LOCATIONS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT PLAN SPECIFICATIONS HAVE BEEN MET.

7.0 CONTINGENCY PLAN

THE CONTINGENCY PLAN SHALL PROVIDE REMEDIATION FOR THE RESTORATION GOALS THAT HAVE NOT BEEN MET. IF THE DESIRED RESTORATION GOALS, AS MEASURED BY THE MONITORING PROGRAM AND PERFORMANCE STANDARDS, HAVE NOT BEEN MET AND CANNOT BE ACHIEVED THROUGH ROUTINE MAINTENANCE, THEN A DETERMINATION BY SNOHOMISH COUNTY AND THE PROJECT PROPONENT MAY BE MADE TO REQUIRE SUBMITTAL OF A CONTINGENCY PLAN. AFTER WRITTEN APPROVAL BY THE COUNTY, A CONTINGENCY PLAN SHALL BE IMPLEMENTED THAT COMPENSATES FOR THE FAILED GOALS OF THE APPROVED MITIGATION PLAN. IF THE CONTINGENCY PLAN IS SUBSTANTIAL, THE COUNTY SHALL EXTEND THE MONITORING PERIOD.

8.0 PERFORMANCE SECURITY

CERTIFICATE OF OCCUPANCY SHALL NOT BE COMPLETE UNTIL THE RESTORATION PLAN IS INSTALLED, INSPECTED, APPROVED AND BONDED. IN ORDER TO ENSURE THAT THE RESTORATION IS PROPERLY IMPLEMENTED, INCLUDING MONITORING AND CONTINGENCIES, THE PROJECT PROPONENT (PARAMOUNT PETROLEUM) SHALL PROVIDE A PERFORMANCE BOND FOLLOWING SNOHOMISH COUNTY PROCEDURES. THE TOTAL COST, PLUS CONTINGENCY FEES, SHALL BE THE AMOUNT OF THE PERFORMANCE BOND. THE PERFORMANCE BOND SHALL BECOME EFFECTIVE FOLLOWING INSTALLATION AND APPROVAL BY THE COUNTY.

PERFORMANCE STANDARDS	MONITORING METHODS	MONITORING INTERVAL
1. 100 PERCENT SURVIVAL OF ALL INSTALLED NATIVE TREES AND SHRUBS AND HERBACEOUS ONE-YEAR POST INSTALLATION. 2. ESTABLISHMENT OF TRANSECTS IN RESTORATION MONITORING PLANTING AREAS FOR FIVE YEARS OF COVERAGE DATA. 3. FOR MARINE RIPARIAN MONITORING: TREE AND SHRUB AND HERBACEOUS COVER: >60% BY YEAR 3, 85% BY YEAR 5, TREE, SHRUB AND HERBACEOUS SURVIVAL: 100% BY YEAR 1, 85% BY YEAR 3, 60% BY YEAR 5. 4. FOR RIPARIAN BUFFER MONITORING: TREE AND SHRUB COVER: > 60% BY YEAR 3, 85% BY YEAR 5. TREE AND SHRUB SURVIVAL: 100% BY YEAR 1, 85% BY YEAR 3, 60% BY YEAR 5. 5. FOR STREAM CHANNEL MONITORING: TREE AND SHRUB COVER: >60% BY YEAR 3, 85% BY YEAR5. TREE AND SHRUB SURVIVAL: 100% BY YEAR 1, 55% BY YEAR 3, 60% BY YEAR 5.	1. TOTAL PLANT COUNT OF INSTALLED TREES AND SHRUBS SHALL DETERMINE ONE YEAR WARRANTY AND PERFORMANCE STANDARD OF SURVIVAL. 2. INSTALLED TREE, SHRUB AND HERBACEOUS COVERAGE SHALL BE ESTIMATED USING THE LINE-INTERCEPT METHOD ALONG TRANSECTS ESTABLISHED IN THE RESTORATION AREAS (AS NOTED IN PERFORMANCE STANDARDS) 3. PHOTOGRAPHIC DOCUMENTATION SHALL OCCUR WITH EACH MONITORING FROM ESTABLISHED PHOTOPOINTS TO PROVIDE ADDITIONAL DOCUMENTATION OF PLANT SUCCESS.	YEARS 1, 2, 3, 4 AND 5 (RESTORATION VEGETATION AREAS)
6. AT LEAST 3 NATIVE CONIFERS, 5 NATIVE SHRUBS AND 3 NATIVE HERBACEOUS SPECIES SHALL BE ESTABLISHED IN THE RESTORATION AREA.		YEARS 1, 2, 3, 4 AND 5 (RESTORATION VEGETATION AREAS)
7. UP TO 20% OF ANY STRATUM CAN BE COMPOSED OF DESIRABLE NATIVE VOLUNTEERS WHEN MEASURING COVER. NO MORE THAN 10% COVER OF NON-NATIVE OR OTHER INVASIVES, E.G., HIMALAYAN BLACKBERRY, JAPANESE KNOTWEED, EVERGREEN BLACKBERRY, REED CANARYGRASS, SCOTS BROOM, ENGLISH IVY, MORNING GLORY, ETC. IS PERMISSIBLE IN ANY MONITORING YEAR. BOND HOLDERS ARE ENCOURAGED TO MAINTAIN RESTORATION SITES WITHIN THESE STANDARDS THROUGHOUT THE MONITORING PERIOD, TO AVOID CORRECTIVE MEASURES.		YEARS 1, 2, 3, 4 AND 5 (RESTORATION VEGETATION AREAS)

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Point Wells
Development

BSRE
Point Wells, LP

c/o Karr Tuttle Campbell
1201 Third Avenue, Suite 2900
Seattle, Washington 98101

in association with:

ROLE

Company Name



DAVID EVANS
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Sheet Information

Date 03/04/2011
Job Number 169009.000
Drawn GBK
Checked JCGA
Approved SASW

Title

RESTORATION
OVERVIEW
AND
STANDARDS

Sheet

RP-4

PRELIMINARY DRAFT
NOT Issued for Construction

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100% URBAN CENTER SUBMITTAL 03/04/2011

APPENDIX B

SITE PHOTOGRAPHS

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PHOTO 1



PHOTO 2

- 1 Site view looking north from access ramp.
- 2 Site view looking northwest from access ramp.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix B



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PHOTO 3



PHOTO 4

3 View looking west atop ramp to Point Wells.

4 Site photo.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

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PHOTO 5



PHOTO 6

5

On-site structures.

6

Overview of southern shoreline.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix B



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PHOTO 7



PHOTO 8

- 7 Southern shoreline where the Brightwater outfall is being constructed.
- 8 Southern shoreline where the Brightwater outfall is being constructed.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

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PHOTO
9



PHOTO
10

9 Outfall 003, which conveys flow from Chevron and South Creek to Puget Sound.

10 View looking south toward primary dock.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix B



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PHOTO 11

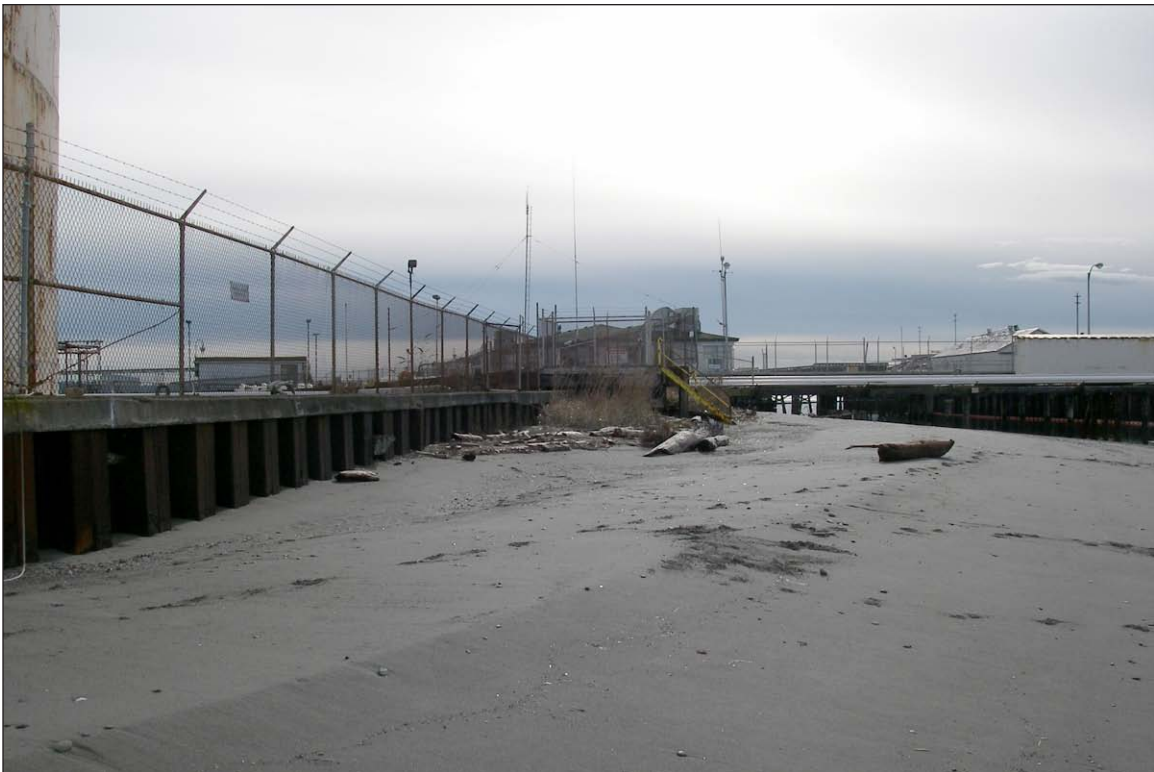


PHOTO 12

11 Office area cantilevered over shoreline near central shoreline.

12 View looking south immediately north of shoreline office.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

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PHOTO 13



PHOTO 14

13 American dunegrass near central portion of shoreline.

14 View of central shoreline from primary dock.

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15 Central portion of project site at high tide.

16 Central portion of project site at high tide.

Site Photographs

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PHOTO
17



PHOTO
18

17 View looking north from project site dock.

18 Upper beach along central project shoreline.

Site Photographs

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PARA0000-0002

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PHOTO
19



PHOTO
20

19

Dolphin near shoreline.

20

Old dock used by cormorants.

Site Photographs

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PHOTO 21



PHOTO 22

21 Shoreline armoring south-central edge.

22 Shoreline armoring south-central edge.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

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PHOTO
23

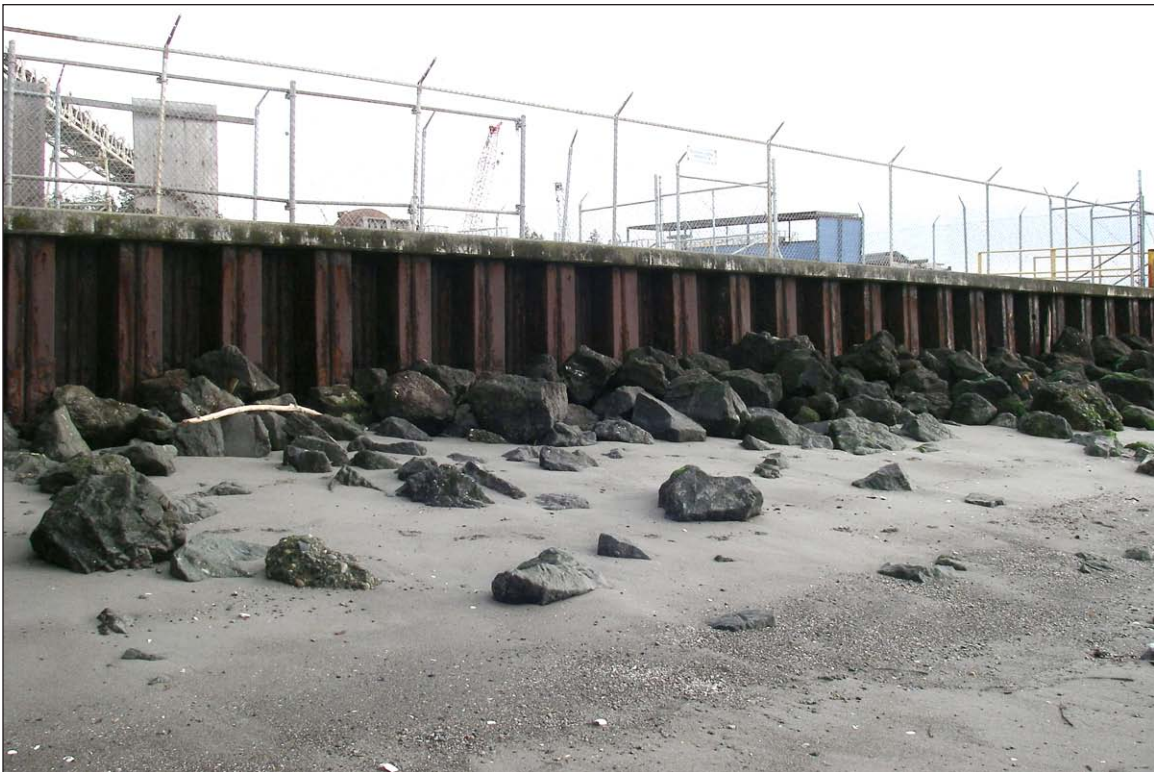


PHOTO
24

23 Different shoreline armoring along southwest edge.

24 Different shoreline armoring along southwest edge.

Site Photographs

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PARA0000-0002

November 2010

Appendix B



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PHOTO
25



PHOTO
26

25 Outfall 002 that conveys stormwater runoff to Puget Sound.

26 Northwest shoreline.

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Appendix B



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PHOTO
27



PHOTO
28

(27) View looking south atop riprap along northwest shoreline.

(28) View looking north atop riprap along northwest shoreline.

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PHOTO
29



PHOTO
30

29

View of northern beach.

30

Shoreline along northwest portion of Point Wells.
Remains of old piles in foreground.

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PHOTO
31



PHOTO
32

31 View of Point Wells from northern beach.

32 Ditch outlet to Puget Sound.

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PARA0000-0002

November 2010

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PHOTO
33



PHOTO
34

33 On-site ditch that conveys runoff from the bluff to Puget Sound.

34 Ditch along east side of railroad tracks that collects runoff prior to being discharged to project site (see Photo 33)

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix B



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PHOTO
35



PHOTO
36

35 On-site Retention Pond on Chevron Creek.

36 Chevron Creek immediately upstream of Retention Pond in Photo 35.

Site Photographs

BSRE Point Wells, LP

PARA0000-0002

November 2010

Appendix B



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APPENDIX C

WETLAND A FORMS

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WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Paramount Petroleum - Point Wells City/County: Snohomish Sampling Date: 11-23-09
 Applicant/Owner: Paramount Petroleum State: WA Sampling Point: DP 1
 Investigator(s): Scott Swarts and Jim Shannon Section, Township, Range: S35, T27N, R3E
 Landform (hillslope, terrace, etc.): Hill Slope in old road cut Local relief (concave, convex, none): Slope Slope (%): 1 - 5
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: Alderwood-Everett gravelly sandy loam. NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
1. <u>Alnus rubra</u> (red alder)	<u>50</u>	Yes	FAC	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
<u>50</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: 10 ft radius)				
1. <u>Rubus spectabilis</u> (salmonberry)	<u>50</u>	Yes	FAC	
2. _____	_____	_____	_____	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
<u>50</u> = Total Cover				
Herb Stratum (Plot size: 5 ft radius)				
1. <u>Tolmiea menziesii</u> (piggy-back plant)	<u>60</u>	Yes	FAC	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>60</u> = Total Cover				
Woody Vine Stratum (Plot size: _____)				
1. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2. _____	_____	_____	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum _____				
Remarks:				

SOIL

Sampling Point: DP 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10	10YR 3/2						silty loam	with some sand
16 +	5Y 5/1	60	7.5YR 5/6	40	C	M	clay	mottles

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input checked="" type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) <input type="checkbox"/> Sandy Gleyed Matrix (S4)	Indicators for Problematic Hydric Soils³: <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> 2 cm Muck (A10) <input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Other (Explain in Remarks)
---	--

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one required; check all that apply)				Secondary Indicators (2 or more required)			
<input type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> High Water Table (A2) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) <input type="checkbox"/> Salt Crust (B11) <input type="checkbox"/> Aquatic Invertebrates (B13) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Raised Ant Mounds (D6) (LRR A) <input type="checkbox"/> Frost-Heave Hummocks (D7)					
Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>NA</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>four</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>one</u> (includes capillary fringe)				Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>			
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:							
Remarks:							

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Paramount Petroleum – Point Wells City/County: Snohomish Sampling Date: 11-23-09
 Applicant/Owner: Paramount Petroleum State: WA Sampling Point: DP 2
 Investigator(s): Scott Swarts and Jim Shannon Section, Township, Range: S35, T27N, R3E
 Landform (hillslope, terrace, etc.): Hill slope in old road cut Local relief (concave, convex, none): Slope Slope (%): 1 - 5
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: _____
 Soil Map Unit Name: Alderwood-Everett gravelly sandy loam NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67</u> (A/B)
1. <u>Alnus rubra</u> (red alder)	<u>75</u>	Yes	FAC	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
<u>75</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: _____)				
1. <u>Rubus spectabilis</u> (salmonberry)	<u>75</u>	Yes	FAC	
2. _____	_____	_____	_____	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
<u>75</u> = Total Cover				
Herb Stratum (Plot size: _____)				
1. <u>Polystichum munitum</u> (sword fern)	<u>20</u>	Yes	FACU	
2. <u>Tolmiea menziesii</u> (piggy-back plant)	<u>5</u>	No	FAC	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>25</u> = Total Cover				
Woody Vine Stratum (Plot size: _____)				
1. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2. _____	_____	_____	_____	
_____ = Total Cover				
% Bare Ground in Herb Stratum _____				
Remarks:				

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0 - 8	10YR 3/2	100					silty loam	
8 - 16+	10YR 4/2	100					silty loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) <input type="checkbox"/> Sandy Gleyed Matrix (S4)	Indicators for Problematic Hydric Soils³: <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> 2 cm Muck (A10) <input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Other (Explain in Remarks)
--	--

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one required; check all that apply)				Secondary Indicators (2 or more required)			
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) <input type="checkbox"/> Salt Crust (B11) <input type="checkbox"/> Aquatic Invertebrates (B13) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Raised Ant Mounds (D6) (LRR A) <input type="checkbox"/> Frost-Heave Hummocks (D7)					
Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)				Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>			
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:							
Remarks:							

Wetland name or number Wetland A

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 – Updated July 2006 to increase accuracy and reproducibility among users

Updated Oct. 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): Wetland A Date of site visit: 11-23-09

Rated by: Scott Swarts Trained by Ecology? Yes X No Date of training: 11/6/08

SEC: 35 TWSHP: 27N RNGE: 3E Is S/T/R in Appendix D? Yes No X

Map of wetland unit: Figure Appendix A Estimated size 3,716 square feet (0.085 acre)

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland: I II III IV X

Category I = Score > 70	Score for Water Quality Functions	3
Category II = Score 51 - 69	Score for Hydrologic Functions	6
Category III = Score 30 – 50	Score for Habitat Functions	20
Category IV = Score < 30	TOTAL Score for Functions	29

Category based on SPECIAL CHARACTERISTICS of Wetland I II Does not apply X

Final Category (choose the “highest” category from above)

IV

Summary of basic information about the wetland unit.

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		Depressional	
Natural Heritage Wetland		Riverine	
Bog		Lake-fringe	
Mature Forest		Slope	X
Old Growth Forest		Flats	
Coastal Lagoon		Freshwater Tidal	
Interdunal			
None of the above	X	Check if unit has multiple HGM classes present	

Does the wetland being rated meet any of the criteria below? If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands that Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. <i>Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered animal or plant species (T/E species)?</i> For the purposes of this rating system, “documented” means the wetland is on the appropriate state or federal database.		X
SP2. <i>Has the wetland unit been documented as habitat for any State listed Threatened or Endangered animal species?</i> For the purposes of this rating system, “documented” means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category 1 Natural Heritage Wetlands (see p. 19 of data form).		X
SP3. <i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i>		X
SP4. <i>Does the wetland unit have a local significance in addition to its functions?</i> For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands in to those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands for Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?

☐ **NO** – go to 2 **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

YES – **Freshwater Tidal Fringe** **NO** – **Saltwater Tidal Fringe (Estuarine)**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is a Saltwater Tidal Fringe it is rated as an **Estuarine** wetland. Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term “Estuarine” wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p. ____).*

2. The entire wetland unit is flat and precipitation is only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

☐ **NO** – go to 3 **YES** – The wetland class is **Flats**

If your wetland can be classified as a “Flats” wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland meet both of the following criteria?

- _____ The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) where at least 20 acres (8ha) in size;
 _____ At least 30% of the open water area is deeper than 6.6 (2 m)?

☐ **NO** – go to 4 **YES** – The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland meet all of the following criteria?

- _____ The wetland is on a slope (*slope can be very gradual*).
 _____ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
 _____ The water leaves the wetland **without being impounded?**

NOTE: Surface water does not pond in these types of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 foot deep).

NO – go to 5 ☐ **YES** – The wetland class is **Slope**

5. Does the entire wetland meet all of the following criteria?

- _____ The unit is in a valley or stream channel where it gets inundated by overbank flooding from that stream or river.
 _____ The overbank flooding occurs at least once every two years.

NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding..

NO – go to 6 **YES** – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time of the year. This means that any outlet, if present is higher than the interior of the wetland.

NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

No – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. **NOTE:** Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit, classify the wetland using the class that represents more than 90% of the total area.

<i>HGM Classes within the wetland unit being rated</i>	<i>HGM Class to Use in Rating</i>
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes

S Slope Wetlands		Points
WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.		(only 1 score per box) (see p.64)
S 1	Does the wetland have the <u>potential</u> to improve water quality?	
S 1.1	Characteristics of average slope of unit: <ul style="list-style-type: none"> Slope is 1% or less (a 1% slope has a 1 ft. vertical drop in elevation for every 100 ft. horizontal distance)..... points = 3 Slope is 1% - 2% points = 2 Slope is 2% - 5% points = 1 Slope is greater than 5% points = 0 	2
S 1.2	The soil 2 inches below the surface (or duff layer) is clay, organic (Use NRCS definitions). YES = 3 points NO = 0 points	0
S 1.3	Characteristics of the vegetation in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches. <ul style="list-style-type: none"> Dense, uncut, herbaceous vegetation > 90% of the wetland area..... points = 6 Dense, uncut, herbaceous vegetation > 1/2 of area points = 3 Dense, woody, vegetation > 1/2 of area..... points = 2 Dense, uncut, herbaceous vegetation > 1/4 of area points = 1 Does not meet any of the criteria above for vegetation points = 0 Aerial photo or map with vegetation polygons	Figure ____ 1
Total for S 1 Add the points in the boxes above		3
S 2	Does the wetland have the <u>opportunity</u> to improve water quality? Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity. _____ Grazing in the wetland or within 150 ft _____ Untreated stormwater discharges to wetland _____ Tilled fields, logging, or orchards within 150 ft. of wetland _____ Residential, urban areas, or golf courses are within 150 ft. upslope of wetland _____ Other _____ YES multiplier is 2 NO multiplier is 1	(see p. 67) Multiplier 1
♦ TOTAL – Water Quality Functions Multiply the score from S1 by S2; then add score to table on p. 1		3
HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.		
S 3	Does the wetland have the <u>potential</u> to reduce flooding and stream erosion?	(see p.68)
S 3.1	Characteristics of vegetation that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland (stems of plants should be thick enough (usually > 1/8in), or dense enough to remain erect during surface flows). <ul style="list-style-type: none"> Dense, uncut, rigid vegetation covers > 90% of the area of the wetland points = 6 Dense, uncut, rigid vegetation > 1/2 area of wetland..... points = 3 Dense, uncut, rigid vegetation > 1/4 area..... points = 1 More than 1/4 of area is grazed, mowed, tilled, or vegetation is not rigid points = 0 	3
S 3.2	Characteristics of slope wetland that holds back small amounts of flood flows. The slope has small surface depressions that can retain water over at least 10% of its area. YES = 2 points NO = 0 points	0
Add the points in the boxes above		3
S 4	Does the wetland have the <u>opportunity</u> to reduce flooding and erosion? Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? Note which of the following conditions apply. _____ Wetland has surface runoff that drains to a river or stream that has flooding problems <u>X</u> Other helps reduce downstream flooding (Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam) YES multiplier is 2 NO multiplier is 1	(see p. 70) Multiplier 2
♦ TOTAL – Hydrologic Functions Multiply the score from S3 by S4; then add score to table on p. 1		6

Comments:

These questions apply to wetlands of all HGM classes.		Points (only 1 score per box)
HABITAT FUNCTIONS – Indicators that wetland functions to provide important habitat.		
H 1	Does the wetland have the <u>potential</u> to provide habitat for many species?	
H 1.1	<p>Vegetation structure (see P. 72): Check the types of vegetation classes present (as defined by Cowardin) – Size threshold for each class is 1/4 acre or more than 10% of the area if unit is smaller than 2.5 acres.</p> <p> <input type="checkbox"/> Aquatic Bed <input type="checkbox"/> Emergent plants <input type="checkbox"/> Scrub/shrub (areas where shrubs have > 30% cover) <input checked="" type="checkbox"/> Forested (areas where trees have > 30% cover) If the unit has a forested class check if: <input checked="" type="checkbox"/> The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon. Add the number of vegetation types that qualify. If you have: </p> <div style="display: flex; justify-content: space-between;"> <div> <p>4 structures or more..... points = 4 2 structures..... points = 1</p> </div> <div> <p>Map of Cowardin vegetation classes 3 structures..... points = 2 1 structure..... points = 0</p> </div> </div>	<p>Figure ____</p> <p>1</p>
H 1.2	<p>Hydroperiods (see p.73): Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 acre to count (see text for descriptions of hydroperiods).</p> <p> <input type="checkbox"/> Permanently flooded or inundated <input type="checkbox"/> Seasonally flooded or inundated <input type="checkbox"/> Occasionally flooded or inundated <input checked="" type="checkbox"/> Saturated only <input type="checkbox"/> Permanently flowing stream or river in, or adjacent to, the wetland <input type="checkbox"/> Seasonally flowing stream in, or adjacent to, the wetland <input type="checkbox"/> Lake-fringe wetland..... = 2 points <input type="checkbox"/> Freshwater tidal wetland..... = 2 points </p> <p style="text-align: right;">Map of hydroperiods</p>	<p>Figure ____</p> <p>0</p>
H 1.3	<p>Richness of Plant Species (see p. 75): Count the number of plant species in the wetland that cover at least 10 ft² (different patches of the same species can be combined to meet the size threshold) You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle.</p> <p>If you counted: </p> <div style="display: flex; justify-content: space-between;"> <div> <p>> 19 species points = 2 5 – 19 species..... points = 1 < 5 species points = 0</p> </div> <div> <p>List species below if you want to: _____ _____ _____ _____</p> </div> </div>	<p>1</p>
H 1.4	<p>Interspersion of Habitats (see p. 76): Decided from the diagrams below whether interspersion between Cowardin vegetation (described in H1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.</p> <div style="display: flex; align-items: center;"> <div style="flex: 1;"> <p>None = 0 points Low = 1 point Moderate = 2 points</p> <p>High = 3 points [riparian braided channels]</p> </div> <div style="flex: 1; padding-left: 20px;"> <p>Note: If you have 4 or more classes or 3 vegetation classes and open water, the rating is always “high”.</p> <p>Use map of Cowardin classes.</p> </div> </div>	<p>Figure ____</p> <p>0</p>
H 1.5	<p>Special Habitat Features (see p. 77): Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.</p> <p> <input checked="" type="checkbox"/> Large, downed, woody debris within the wetland (> 4 in. diameter and 6 ft. long) <input checked="" type="checkbox"/> Standing snags (diameter at the bottom > 4 inches) in the wetland <input type="checkbox"/> Undercut banks are present for at least 6.6 ft. (2m) and/or overhanging vegetation extends at least 3.3 ft. (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft. (10m) <input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (cut shrubs or trees that have not yet turned grey/brown) <input type="checkbox"/> At least 1/4 acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated (structures for egg-laying by amphibians) <input checked="" type="checkbox"/> Invasive plants cover less than 25% of the wetland area in each stratum of plants NOTE: The 20% stated in early printings of the manual on page 78 is an error. </p>	<p>3</p>
H 1 TOTAL Score – potential for providing habitat		<p>Add the points in the column above</p> <p>5</p>

H 2	Does the wetland have the <u>opportunity</u> to provide habitat for many species?	(only 1 score per box)
	<p>H 2.1 <u>Buffers</u> (see P. 80): <i>Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed".</i></p> <p>___ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 95% of circumference. No structures are within the undisturbed part of buffer (relatively undisturbed also means no grazing, no landscaping, no daily human use)..... points = 5</p> <p><u>X</u> 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference points = 4</p> <p>___ 50m (170 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 95% circumference points = 4</p> <p>___ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference points = 3</p> <p>___ 50m (170 ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference points = 3</p> <p>If buffer does not meet any of the criteria above:</p> <p>___ No paved areas (except paved trails) or buildings within 25m (80 ft) of wetland > 95% circumference. Light to moderate grazing or lawns are OK points = 2</p> <p>___ No paved areas of buildings within 50m of wetland for > 50% circumference. Light to moderate grazing or lawns are OK..... points = 2</p> <p>___ Heavy grazing in buffer points = 1</p> <p>___ Vegetated buffers are < 2m wide (6.6 ft) for more than 95% circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland) points = 0</p> <p>___ Buffer does not meet any of the criteria above points = 1</p> <p style="text-align: right;">Arial photo showing buffers</p>	<p>Figure ____</p> <p style="text-align: center;">4</p>
	<p>H 2.2 <u>Corridors and Connections</u> (see p. 81)</p> <p>H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft. wide, has at least a 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (<i>Dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor.</i>)</p> <p style="text-align: center;">YES = 4 points (go to H 2.3) <u>NO</u> = go to H 2.2.2</p> <p>H. 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50 ft. wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? OR a Lake-fringe wetland, if it does not have an undisturbed corridor as in the question above?</p> <p style="text-align: center;"><u>YES</u> = 2 points (go to H 2.3) NO = go to H 2.2.3</p> <p>H. 2.2.3 Is the wetland:</p> <ul style="list-style-type: none"> • Within 5 mi (8km) of a brackish or salt water estuary OR • Within 3 miles of a large field or pasture (> 40 acres) OR YES = 1 point • Within 1 mile of a lake greater than 20 acres? NO = 0 points 	<p style="text-align: center;">2</p>

Comments:

	<p>H 2.3 <u>Near or adjacent to other priority habitats listed by WDFW</u> (see p. 82): (see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)</p> <p>Which of the following priority habitats are within 330 ft. (100m) of the wetland unit? <i>NOTE: the connections do not have to be relatively undisturbed.</i></p> <p><input type="checkbox"/> Aspen Stands: Pure or mixed stands of aspen greater than 0.4 ha (1 acre).</p> <p><input type="checkbox"/> Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (full descriptions in WDFW PHS report p. 152).</p> <p><input type="checkbox"/> Herbaceous Balds: Variable size patches of grass and forbs on shallow soils over bedrock.</p> <p><input type="checkbox"/> Old-growth/Mature forests: (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. (Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.</p> <p><input type="checkbox"/> Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (full descriptions in WDFW PHS report p. 158).</p> <p><input checked="" type="checkbox"/> Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.</p> <p><input type="checkbox"/> Westside Prairies: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (full descriptions in WDFW PHS report p. 161).</p> <p><input checked="" type="checkbox"/> Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.</p> <p><input type="checkbox"/> Nearshore: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).</p> <p><input type="checkbox"/> Caves: A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.</p> <p><input type="checkbox"/> Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft.</p> <p><input type="checkbox"/> Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.</p> <p><input checked="" type="checkbox"/> Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long.</p> <p>If wetland has 3 or more priority habitats = 4 points If wetland has 2 priority habitats = 3 points If wetland has 1 priority habitat = 1 point No habitats = 0 points</p> <p>Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)</p>	4
	<p>H 2.4 <u>Wetland Landscape:</u> Choose the one description of the landscape around the wetland that best fits (see p. 84)</p> <ul style="list-style-type: none"> • There are at least 3 other wetlands within 1/2 mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development..... points = 5 • The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within 1/2 milepoints = 5 • There are at least 3 other wetlands within 1/2 mile, BUT the connections between them are disturbed.points = 3 • The wetland fringe on a lake with disturbance and there are 3 other lake-fringe wetlands within 1/2 milepoints = 3 • There is at least 1 wetland within 1/2 milepoints = 2 • There are no wetlands within 1/2 mile.....points = 0 	5
	<p>H 2 TOTAL Score – opportunity for providing habitat Add the scores from H2.1, H2.2, H2.3, H2.4</p>	15
	<p style="text-align: right;">TOTAL for H 1 from page 8</p>	5
◆	<p>Total Score for Habitat Functions Add the points for H 1 and H 2; then record the result on p. 1</p>	20

Comments:

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

***Please determine if the wetland meets the attributes described below
and circle the appropriate answers and Category.***

Wetland Type – Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.	
SC1	<u>Estuarine wetlands?</u> (see p.86) Does the wetland unit meet the following criteria for Estuarine wetlands? <input type="checkbox"/> The dominant water regime is tidal, <input type="checkbox"/> Vegetated, and <input type="checkbox"/> With a salinity greater than 0.5 ppt. YES = Go to SC 1.1 NO <u>X</u>
	SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? YES = Category I NO = go to SC 1.2 Cat. I
	SC 1.2 Is the wetland at least 1 acre in size and meets at least two of the following conditions? YES = Category I NO = Category II <input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native <i>Spartina</i> spp., are only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of <i>Spartina</i> would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of <i>Spartina</i> in determining the size threshold of 1 acre. <input type="checkbox"/> At least 3/4 of the landward edge of the wetland has a 100 ft. buffer of shrub, forest, or un-grazed or un-mowed grassland <input type="checkbox"/> The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Cat. I Cat. II Dual Rating I/II
SC2	<u>Natural Heritage Wetlands</u> (see p. 87) Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland being rated in a Section/Township/Range that contains a natural heritage wetland? (This question is used to screen out most sites before you need to contact WNHP/DNR.) S/T/R information from Appendix D _____ or accessed from WNHP/DNR web site <u>X</u> YES _____ Contact WNHP/DNR (see p. 79) and go to SC 2.2 NO <u>X</u> SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as a site with state threatened or endangered plant species? YES = Category 1 NO _____ not a Heritage Wetland Cat I
SC3	<u>Bogs</u> (see p. 87) Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? Use the key below to identify if the wetland is a bog. <i>If you answer yes you will still need to rate the wetland based on its function.</i> 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of soil profile? (See Appendix B for a field key to identify organic soils)? YES = go to question 3 <u>NO</u> = go to question 2 2. Does the wetland have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? YES = go to question 3 <u>NO</u> = is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the “bog” species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? YES = Is a bog for purpose of rating NO = go to question 4 NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16” deep. If the pH is less than 5.0 and the “bog” plant species in Table 3 are present, the wetland is a bog. 4. Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann’s spruce, or western white pine. WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover (> 30% coverage of the total shrub/herbaceous cover)? YES = Category I NO = Is not a bog for purpose of rating Cat. I

SC4	<p>Forested Wetlands (see p. 90)</p> <p>Does the wetland have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? <i>If you answer yes you will still need to rate the wetland based on its function.</i></p> <p>____ Old-growth forests: (west of Cascade Crest) Stands of at least two three species forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm or more).</p> <p>NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter.</p> <p>____ Mature forests: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have an average diameters (dbh) exceeding 21 inches (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.</p> <p>YES = Category I <input type="checkbox"/> NO = ____ not a forested wetland with special characteristics</p>	Cat. I
SC5	<p>Wetlands in Coastal Lagoons (see p. 91)</p> <p>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <p>____ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks.</p> <p>____ The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom.</i>)</p> <p>YES = Go to SC 5.1 <input type="checkbox"/> NO ____ not a wetland in a coastal lagoon</p> <p>SC 5.1 Does the wetland meet all of the following three conditions?</p> <p>____ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing) and has less than 20% cover of invasive plant species (see list of invasive species on p. 74).</p> <p>____ At least 3/4 of the landward edge of the wetland has a 100 ft. buffer of shrub, forest, or un-grazed or un-mowed grassland.</p> <p>____ The wetland is larger than 1/10 acre (4350 square ft.)</p> <p>YES = Category I NO = Category II</p>	Cat. I Cat. II
SC6	<p>Interdunal Wetlands (see p. 93)</p> <p>Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)?</p> <p>YES = Go to SC 6.1 <input type="checkbox"/> NO ____ not an interdunal wetland for rating</p> <p><i>If you answer yes you will still need to rate the wetland based on its functions.</i></p> <p>In practical terms that means the following geographic areas:</p> <ul style="list-style-type: none"> • Long Beach Peninsula -- lands west of SR 103 • Grayland-Westport -- lands west of SR 105 • Ocean Shores-Copalis -- lands west of SR 115 and SR 109 <p>SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is one acre or larger?</p> <p>YES = Category II NO = go to SC 6.2</p> <p>SC 6.2 Is the wetland between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre?</p> <p>YES = Category III</p>	Cat. II Cat. III
◆	<p>Category of wetland based on Special Characteristics</p> <p>Choose the "highest" rating if wetland falls into several categories, and record on p. 1.</p> <p>If you answered NO for all types enter "Not Applicable" on p. 1</p>	NA

Comments: